Operation/Reference Guide

ICSLan Device Control Boxes

EXB-COM2
EXB-I/O8
EXB-IRS4
EXB-MP1
EXB-REL8

Central Controllers

Last Revised: 8/02/2012

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ICSLan Device Control Boxes

Overview

The EXB family of ICSLan Device Control Boxes (FIG. 1) provides Ethernet-based remote port expansion for NetLinx Central Controllers. ICSLan Device Control Boxes may be used to provide remote ports for a master (eliminating the need to implement another Central Controller), or to provide large numbers of ports in a rack-mount environment.

EXB-MP1 (FG2100-26)

EXB-COM2 (FG2100-22)

EXB-I/08 (FG2100-21)

EXB-IRS4 (FG2100-23)

EXB-REL8 (FG2100-20)

FIG. 1 ICSLan Device Control Boxes

ICSLan Device Control Boxes - Product Family			
Name	FG#	Description	Page Reference
EXB-COM2	FG2100-22	ICSLan Serial Interface, 2 Ports	See page 17
EXB-I/O8	FG2100-21	ICSLan Input/Output Interface, 8 Channels	See page 21
EXB-IRS4	FG2100-23	ICSLan IR/S Interface, 4 IR/S and 4 Inputs	See page 25
EXB-MP1	FG2100-26	ICSLan Multi-Port, 1 COM, 1 IR/S, 2 I/O, 1 IR RX	See page 31
EXB-REL8	FG2100-20	ICSLan Relay Interface, 8 Channels	See page 35

Common Features

Many features are common to all products in the EXB family, as described in the following table. Model -specific features are described in the following sections.

ICSLan Device Control Boxes - Common Features		
Dimensions (HWD):	• EXB-COM2, -I/O8, -IRS4 and -REL8: 1.00” x 4.35” x 5.15” (25.48 x 110.36 x 130.81) • EXB-MP1: 1.00” x 3.04” x 4.82” (25.48cm x 77.14cm x 122.43cm)	
Weight:	• EXB-COM2: 1 lb (454 g) • EXB-I/O8: 1 lb (454 g) • EXB-IRS4: 1 lb (454 g) • EXB-MP1: 1 lb (454 g) • EXB-REL8: 1 lb (454 g)	
Power Requirements:	PoE (Power-over-Ethernet).	
	Idle (minimum) Power Draw:	Busy (maximum) Power Draw
• EXB-COM2:	40mA 1.92 watts	40mA 1.92 watts
• EXB-IO8:	30mA 1.44 watts	40mA 1.92 watts
• EXB-IRS4:	40mA 1.92 watts	50mA 2.4 watts
• EXB-MP1	40mA 1.92 watts	40mA 1.92 watts
• EXB-REL8:	40mA 1.92 watts	70mA 3.36 watts
Enclosure:	Metal with black matte finish	
Front Panel Components		
ID Pushbutton:	The ID Pushbutton serves four functions: • **ID Mode**: Used in conjunction with the ID Mode feature in NetLinx Studio, a momentary push assigns a device address to the Module. See the *Using "Identify Mode" to Set the Device Address on the EXB Modules* section on page 13 for details. • **Static/DHCP**: If the button is pressed and held for 10 seconds or longer and then released, the unit toggles between static and dynamic IP addressing. See the *Toggling Between Static and DHCP IP Addressing* section on page 14 for details. • **Factory Reset:** If the ID button is held for 10 seconds or longer during the boot process, the unit will reset to factory defaults. See the *Performing a Factory Reset* section on page 14 for details. • **Factory Image**: If the ID pushbutton is held for 20 seconds and released while the Module is booting up, the Module will restore itself to a factory firmware image. See the *Resetting the Unit to the Factory Default Firmware Image* section on page 14 for details.	
Status LED:	The green Status LED indicates unit status. See the *Detailed LED Behavior* section on page 4 for details.	
L/A LED:	The green L/A (Link / Active) LED indicates communication status. See the *Detailed LED Behavior* section on page 4 for details.	
Rear Panel Components		
Ethernet / PoE Connector	RJ-45 connector provides IP communication and PoE. This is an Auto MDI/MDI-X enabled port, therefore either straight-through or crossover Ethernet cables can be used. ***Note**: The Ethernet connector is located on the front panel of the EXB-MP1 (see FIG. 9 on page 31)*	
Module Specific Connectors	Varies per model - refer to *Connections and Wiring* in each of the following sections.	

ICSLan Device Control Boxes - Common Features (Cont.)	
Storage/Operating Environment:	• Operating Temperature: 0° C (32° F) to 40° C (104° F) • Storage Temperature: -10° C (14° F) to 60° C (140° F) • Operating Humidity: 5% to 85% RH (non-condensing) • Heat Dissipation (Typical): 36.9 BTU/hr • Designed for indoor use only.
Certifications:	FCC Part 15 Class B, CE, and IEC 60950
Included & Optional Accessories	Varies per model - refer to the *Specifications* tables in each of the following sections.

LAN/PoE Port

The LAN/PoE (RJ45) port on all EXB Modules provides 10/100 BaseT network connectivity. Use standard Cat5/6/6E ethernet cable to connect the EXB Module to the LAN. The following table lists the pinouts, signals, and pairing for the Network port.

LAN/PoE Port Pinouts and Signals				
Pin	Signals	Connections	Pairing	Color
1	TX +	1 --------- 1	1 --------- 2	White-Orange
2	TX -	2 --------- 2		Orange
3	RX +	3 --------- 3	3 --------- 6	White-Green
4	no connection	4 --------- 4		Blue
5	no connection	5 --------- 5		White-Blue
6	RX -	6 --------- 6		Green
7	no connection	7 --------- 7		White-Brown
8	no connection	8 --------- 8		Brown

The Ethernet Port LEDs show communication activity, connection status, speeds, and mode information:

- *SPD (speed)* - Yellow LED lights On when the connection speed is 100 Mbps and turns Off when the speed is 10 Mbps.
- *L/A (link/activity)* - Green LED lights On when the Ethernet cables are connected and terminated correctly, and blinks when receiving Ethernet data packets.

Detailed LED Behavior

The table below provides detailed descriptions of all blink patterns for the Status and A/L LEDs on the front panels of all EXB Modules.

- The *I/O LED* column refers to port-specific Input and/or Output LEDs on a particular model. For example, I/O includes all serial TX and RX LEDs on a COM2 or all Relay output LEDs on a REL8.
- The term "*Light Show*" refers to the back-and-forth scanning pattern of the LEDs associated with the I/Os on each model.

EXB Modules - Detailed LED Behavior			
Module Condition	L/A LED	Status LED	I/O LED
Normal Online with Master (rest)	On if connected to master. Blink off w/ data.	Follow Master's instruction for Blink Message if online with Master, otherwise ON	On when active, otherwise off
Normal Boot (DHCP found) ***Note**: This state continues from the time an IP address is obtained until the device is online with the Master.*	OFF	ON	Normal *Light Show*, then OFF until online with Master, then normal operation
Normal Boot (DHCP, no server) ***Note**: This state continues until a valid IP address is obtained.*	Fast Blink, then normal operation	ON	Normal *Light Show*, then OFF until online with Master, then normal operation
Normal Boot (Static IP) ***Note**: This state continues until the device finishes the Light Show.*	OFF during *Light Show*, then normal operation (Off until connected to Master)	Fast Blink (continues only during *Light Show*), then ON until first blink from Master.	Normal *Light Show*, then OFF until online with Master, then normal operation
Boot with ID Pushbutton held down	Slow Blink (1Hz)	Slow Blink (1Hz)	Slow Blink (1Hz)
ID Pushbutton held down long enough for reset to default parameters	Fast Blink until ID Pushbutton is released, then OFF	Fast Blink until ID Pushbutton is released, then OFF	Fast Blink until ID Pushbutton is released, then OFF
ID Pushbutton held down long enough for reset to default firmware image	Solid ON, transitions to OFF once the unit completes writing to flash and is ready to reboot	Solid ON, transitions to OFF once the unit completes writing to flash and is ready to reboot	Solid ON, transitions to OFF once the unit completes writing to flash and is ready to reboot
In Auto ID mode	Normal	Blink (2Hz)	Normal
ID Pushbutton held down long enough to accept new ID	2 Blinks, then normal	2 Blinks, then normal	2 Blinks, then normal
After boot: ID Pushbutton held down, but not long enough for IP mode change	Slow Blink (1Hz)	Slow Blink (1Hz)	Slow Blink (1Hz)
After boot: ID Pushbutton held down long enough for IP mode change	Fast Blink, then OFF	Fast Blink, then OFF	Fast Blink, then OFF
Downloading Firmware to Flash Due to an upgrade via NetLinx Studio.	Fast Blink, alternating with Status LED)	Fast Blink, alternating with L/A LED)	Fast Blink, alternating LEDs

See the *Using the ID Pushbutton* section on page 12 for additional information.

Installation

Mounting Options (Rack Trays and Mounting Brackets)

Refer to the documentation provided with each of the mounting kits for installation instructions (also available online at www.amx.com).

AVB-VSTYLE-SURFACE-MNT (FG1010-722)

V Style Single Module Surface Mount Brackets - Mount a single module to the wall, under a desk, etc (FIG. 2).

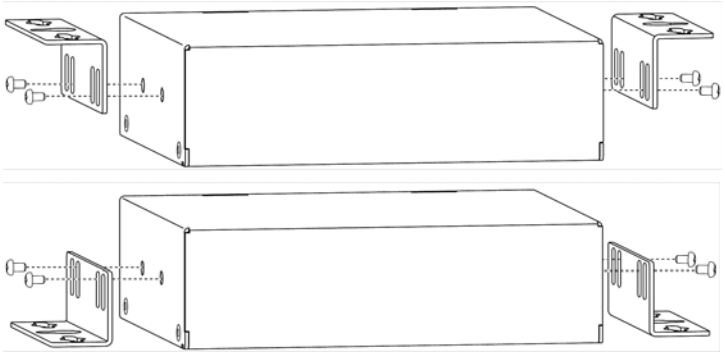

FIG. 2 AVB-VSTYLE-SURFACE-MNT

AVB-VSTYLE-RMK (FG1010-720)

V Style Module Tray Rack - Mount up to four modules side by side in a 1 RU space (FIG. 3).

AVB-VSTYLE-RMK-FILL-1U (FG1010-721)

V Style Module Tray Rack - Mount up to four modules side by side in a 1 RU space, with *Fill Plates* for instances when the entire tray is not full (FIG. 3).

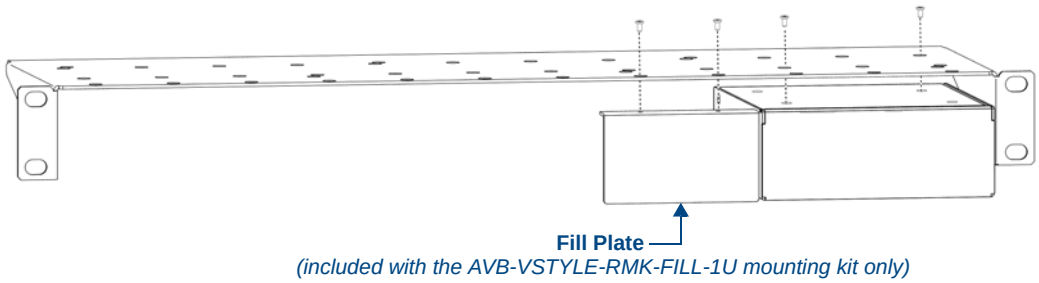

FIG. 3 AVB-VSTYLE-RMK

Note that the tray illustrated in FIG. 3 is shown upside down for ease of installation. However, the tray can be rack-mounted in a rack either way.

Also note that the *Fill Plate* included in this illustration is included only in the AVB-VSTYLE-RMK-FILL-1U (FG1010-721).

NOTE

The AVB-VSTYLE-RMK and AVB-VSTYLE-RMK-FILL-1U mounting kits are appropriate for the EXB-COM2, -IRS4, -IO8 and -REL8 (but not the EXB-MP1).

AVB-VSTYLE-POLE-MNT (FG1010-723)

V Style Single Module Pole Mounting Kit - Suspend a single module to a pole (FIG. 4).

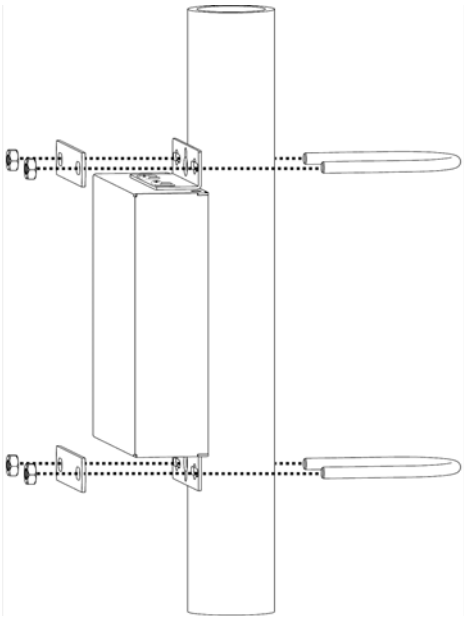

FIG. 4 AVB-VSTYLE-POLE-MNT

SAFETY INSTRUCTIONS

- For UL compliance, the EXB family of ICSLan Device Control Boxes should be powered directly via any listed external IEC/UL 60950-1 2nd edition certified LPS PoE switch or injector, such as the AMX NXA-ENET8POE or PS-POE-AF.
- The EXB family of ICSLan Device Control Boxes are intended for Network Environment 0 per IEC TR62101, and are to be connected only to PoE networks without routing to the outside plant.

Preparing/Connecting Captive Wires

1. Strip 0.25 inch of wire insulation off all wires.
2. Insert each wire into the appropriate opening on the connector according to the wiring diagrams and connector types described in this section.

   Do not tighten the screws excessively; doing so may strip the threads and damage the connector.

LAN/PoE Port

The LAN/PoE (RJ45) port on all EXB Modules provides 10/100 BaseT network connectivity. Use standard Cat5/6/6E ethernet cable to connect the EXB Module to the LAN. The following table lists the pinouts, signals, and pairing for the Network port.

LAN/PoE Port Pinouts and Signals

Pin	Signals	Connections	Pairing	Color
1	TX +	1 --------- 1	1 --------- 2	White-Orange
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3	RX +	3 --------- 3	3 --------- 6	White-Green
4	DC +	4 --------- 4		Blue
5	DC +	5 --------- 5		White-Blue
6	RX -	6 --------- 6		Green
7	DC -	7 --------- 7		White-Brown
8	DC -	8 --------- 8		Brown

The Ethernet Port LEDs show communication activity, connection status, speeds, and mode information:

- *SPD (speed)* - Yellow LED lights On when the connection speed is 100 Mbps and turns Off when the speed is 10 Mbps.
- *L/A (link/activity)* - Green LED lights On when the Ethernet cables are connected and terminated correctly, and blinks when receiving Ethernet data packets.

Network Configuration

Overview

EXB modules support two IP addressing modes: *Static IP*, and *DHCP (with link-local fallback)*.

NOTE

"Link-Local Fallback" is a method by which an IP host can derive a local network-unique IP address, by negotiating with the other IP hosts on the same network, as a fallback from DHCP. Link-Local can also be used in its own right as the primary method of IP address allocation. See "DHCP Mode" below for details.

By default, EXB Modules are set to **DHCP** Mode.

The modules can be configured for either of these modes via two methods:

- The front-panel ID Pushbutton (see the *Toggling Between Static and DHCP IP Addressing* on page 14).
- Telnet command (see the *Terminal (Telnet) Commands* on page 53).

Default Parameters For Static IP Mode

Default Parameters For Static IP Mode	
Address:	**192.168.1.2**
Netmask:	**255.255.255.0**
Gateway:	**192.168.1.1**
DNS1:	**192.168.1.1**
DNS2:	**192.168.1.1**
DNS3:	**192.168.1.1**

DHCP Mode

When in DHCP mode (the default setting), the module will attempt to get a DHCP lease (consisting of IP address, gateway, and other network parameters). Should it fail to obtain a lease from a DHCP server, it will then configure itself for a link-local address.

- EXB modules utilize a modified link-local addressing procedure: the first address to be tried is a known address in the link-local space: **169.254.2.2**. That address will be probed, and if unclaimed will be used by the EXB module.
- If 169.254.2.2 is already claimed, the EXB module will choose a random address within the 169.252.x.x link-local address space (again probing to ensure that it is unclaimed).

Once operating with a link-local address, the device will periodically re-try DHCP, and re-assign the IP to a valid DHCP grant if successful.

At any time, if the device determines that its IP address has changed, it will disconnect from the Master (if necessary, depending on the connection state), and then reconnect to the Master.

TCP/IP Address Configuration

EXB modules support IPV4 network addresses, gateway addresses, DNS server addresses, and network name. EXB modules support Nexus Discovery Protocol (NDP) capabilities as well as IP discovery via NetLinx Studio.

NOTE

NDP stands for "NetLinx Discovery Protocol", a device discovery method used by NetLinx Masters. With NDP Beacon enabled, the Master will transmit NDP beacons for AMX's proprietary device discovery.

Telnet IP Configuration Commands

The **SET IP** (page 58) and **GET IP** (page 56) Telnet commands listed in the following table can be sent directly to the device via a Telnet terminal session. These commands can be used for initial network configuration of the EXB Modules.

- The default Telnet port is **23**. A value of **0** disables the telnet server.
- Telnet is *enabled* by default.
- See the *Terminal (Telnet) Commands* section on page 53 for details.

Master Connection Modes

The mode of communication used for connection to the Master is specified via the SET CONNECTION Telnet command (see page 57).

The options are "*AUTO*", "*URLTCP*", "*URLUDP*" or "*NDP*", as described below.

Note that default connection mode setting is **NDP**.

- **AUTO** - This mode utilizes TCP communication; it looks for a matching System Number and attempts to come online with the first master it sees with that System Number.
- **URLTCP** - TCP; the Master is specified via URL.
- **URLUDP** - UDP; the Master is specified via URL.
- **NDP** - UDP; this mode utilizes the NDP binding process to assign the EXB Module (the physical device) to a Master via NetLinx Studio. Once bound, communications are conducted via UDP.

In URL modes, the Master can use either an IP address or a DNS name.

TCP vs. UDP

- **TCP** - Protocol has built-in retry mechanism.
- **UDP** - Protocol does not have a built-in retry mechanism, but consumes fewer resources on the Master. AMX's UDP implementation of NetLinx employs a retry mechanism to provide the reliability of TCP, with the resource efficiency of UDP.

URL vs. NDP vs. Auto

Determining which connection method to use for Master Connection Mode is essentially a matter of deciding what information the device should use to identify the correct target Master for connection.

The default mode is NDP; the mode can be changed via the SET CONNECTION Telnet command (see page 57).

- **URL** - The device connects to the Master with the specified URL. The device must be configured with the URL of a specific Master via the SET CONNECTION Telnet command (see page 57).
- **NDP** - The device connects to the Master it's been bound to based on the Masters MAC address. The binding is configured via NetLinx Studio. Once bound, the device must be unbound using either NetLinx Studio or the Telnet NDP UNBIND command before being re-bound to a different Master.

  Alternatively, NDP devices can be bound/unbound via options on the Master's Web Configuration pages (System > Manage NetLinx). Refer to the *NetLinx Integrated Controllers- WebConsole & Programming Guide* (System - Manage NetLinx section) for details.
- **Auto** - The device connects to the first Master it finds with the specified System Number. The device must be configured with the desired system number via the SET CONNECTION Telnet command (see page 57).

  Use of this method requires that only one Master has any particular system number, and is visible to the subnet. If this is the case, then Auto is the most simple choice. However, with Auto, you are not hard-bound to a particular Master. Therefore, if at some point in the future, another Master is configured with the same system number, the result is that the EXB Module could show up on that other Master.

Factory Default Parameters

Factory Default Parameters are the values stored in the unit at the time it leaves the factory. EXB Modules can be restored the unit to their factory default parameters in several ways:

- via the ID Pushbutton (see the *Performing a Factory Reset* section on page 14)
- via the RESET FACTORY telnet command (see page 56)

The factory default parameters are listed below:

Factory Default Parameters	
Parameter	Value
MAC Address	As set in factory
Serial Number	As set in factory
Ethernet mode	Auto (i.e., speed, duplex, both, auto)
IP Addressing Mode	DHCP
IP Address (for static mode)	192.168.1.2
Netmask (for static mode)	255.255.255.0
Gateway (for static mode)	192.168.1.1
DNS1 (for static mode)	192.168.1.1
DNS2 (for static mode)	192.168.1.1
DNS3 (for static mode)	192.168.1.1
DNS Domain	amx.com
Hostname	Last seven digits of the model-serial number - unique for each unit
Master Connection Mode	NDP - See the *Master Connection Modes* section on page 10 for details.
Master URL (for TCP and UDP URL modes)	“” (blank)
Master Connection port number for TCP and UDP URL modes	1319
Friendly-Name	“” (blank) ***Note**: If the Friendly Name is non-blank, both Friendly Name and Location are concatenated to make NDPSTRING2, otherwise NDPSTRING2 is generated from the unit’s serial number.*
Location	“”
Stored MAC address of Master (used for NDP binding)	00:00:00:00:00:00
ICSP Device Number	0 (receive dynamic device number from Master)
System Number	0
Username for Master	Blank (empty string) A blank username and password implies that no encryption will be used
Password for Master	Blank (empty string) A blank username and password implies that no encryption will be used
Telnet port	23 A value of 0 disables the telnet server. Telnet is enabled by default.
Telnet username	Blank (empty string) A blank username and password implies that the telnet server will not query for username password
Telnet password	Blank (empty string)
CTOF time	5 (0.5 seconds)
CTON time	5 (0.5 seconds)
Baud Data Rate/Format	9600, 8, N, 1

Device IDs

Device IDs	
Model	ID (16-bits)
EXB-COM2	0x0164
EXB-I/O8	0x0168
EXB-IRS4	0x0166
EXB-MP1	0x0165
EXB-REL8	0x0167

Using the ID Pushbutton

Use the ID Pushbutton (on the front panel of all EXB Modules) to perform various initial configuration settings, as described in the following sections. The ID Pushbutton provides several functions, depending on when and for how long the pushbutton is pressed and held:

- **Momentary press**: If the device is in ID mode, a momentary press causes the module to identify itself to the system. Note that a momentary press at any other time is ignored.

  See the *Using "Identify Mode" to Set the Device Address on the EXB Modules* section (below) for details.

- **10-Second Press and Hold (*during runtime*)**: If the ID Pushbutton is held for 10 seconds or longer and then released during runtime (i.e., after boot completes), the unit will toggle between Static IP and DHCP Mode IP addressing - after the button is released.

  Note that after applying the new setting, the module will automatically reboot.

  By default, EXB Modules are set to DHCP Mode (with link-local fallback).

  See the *Toggling Between Static and DHCP IP Addressing* section on page 14 for details.

- **10-Second Press and Hold (*during boot-up*)**: If the ID Pushbutton is held for 10 seconds or longer at boot, the module will reset to factory default parameters and reboot after release.

  Press and hold the ID Pushbutton while plugging in the Ethernet / PoE connector. Begin counting only when the LEDs begin to flash (as opposed to the moment that the connector is inserted).

  Note that once the module has started booting up, all LEDs flash in unison at the rate of once per second. After 10 flashes at this rate, the LEDs will flash in unison at a faster rate. At the point that the blink rate increases (approximately 10 seconds after boot-up), release the pushbutton.

  See the *Performing a Factory Reset* section on page 14 for details.

- **20-Second Press and Hold (*during boot-up*)**: If the ID Pushbutton is held for 20 seconds or longer at boot, the module will reset to the factory default firmware image and reboot after release.

  Press and hold the ID Pushbutton while plugging in the Ethernet / PoE connector. Begin counting only when the LEDs begin to flash (as opposed to the moment that the connector is inserted).

  Note that once the module has started booting up, all LEDs flash in unison at the rate of once per second. After 10 flashes at this rate, the LEDs will blink in unison at a faster rate. After 10 seconds of flashing at the increased rate, all LEDs go to solid on. At the point that the LEDs go to solid on (approximately 20 seconds after boot-up), release the pushbutton.

  See the *Resetting the Unit to the Factory Default Firmware Image* section on page 14 for details.

Using "Identify Mode" to Set the Device Address on the EXB Modules

The ID Pushbutton on the front panel of all ICSLan Device Control Boxes is used in conjunction with the NetLinx Studio software application ("Identify Mode" function). Once the EXB Module has been added to a NetLinx System, you can use the ID pushbutton to identify and assign a device address to the Module.

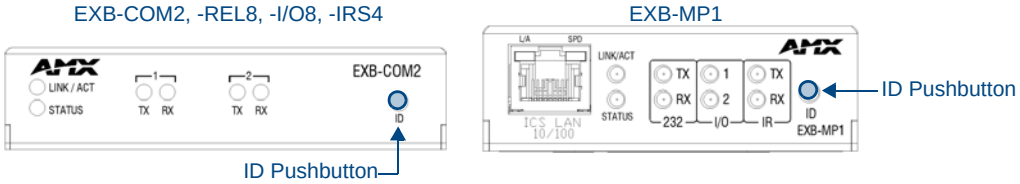


FIG. 5 ID Pushbutton Location

NOTE

The latest version of NetLinx Studio is available to download and install from the www.amx.com web site. Refer to the NetLinx Studio online help for instructions on using the application.

1. In NetLinx Studio, select the System to which the EXB Module is connected in the Online Device Tree.
2. Select *Device Addressing* from either the Online Device Tree context menu or the Diagnostics menu to open the *Device Addressing* dialog. The ID Mode section of the Device Addressing dialog allows you to place the program in ID (Identify) Mode.

   ID Mode means that the entire system is put on hold while it waits for an event from any NetLinx device in the named system (for example, pushing the ID pushbutton on the EXB Module). The device that generates the first event is the device that gets "identified".

   Once a device has been identified, it will be set (or changed to) the Device/System Address specified.

NOTE

If the target Master has security applied, NetLinx Studio will prompt you for a User Name and Password in order to change these settings.

3. In the *ID Mode* section of the dialog, enter the Device and System numbers that you want to assign to the Module, in the (*Change to Device)* **Device** and **System** text boxes.

NOTE

NetLinx Studio (v3.3 or higher) provides the ability to auto-increment IP Addresses and Hostnames as well as Device and System Numbers. Refer to the NetLinx Studio online help for details.

4. Click the **Start Identify Mode** button to place the named System in ID Mode. The text box below this button displays a *Waiting…Press Cancel to Quit* message. The Start Identify Mode button changes to *Cancel Identify Mode* (click to cancel ID Mode).
5. Press the ID button on the EXB Module. This causes the Module to:
   - Respond with an identify mode address response
   - Report its old address offline
   - Report its new address online

The Online Device Tree will refresh to represent the new device address.

Toggling Between Static and DHCP IP Addressing

EXB modules support both Static IP and DHCP addresses, and have a factory default Static IP Address that can be recalled at any time by resetting the unit to its default configuration.

By default, EXB Modules are set to use **DHCP** (with link-local fallback).

Once the Module has booted up, press and hold the ID pushbutton for at least 10 seconds, and release.

- The Module will toggle between static and dynamic IP addressing after release.
- The Module will automatically reboot to complete the process.

NOTE

*EXB Modules can also be set to Static IP or DHCP Mode via the **SET IP** TelNet command (page 58). See the Terminal (Telnet) Commands* section on page 53 *for details.*

Performing a Factory Reset

1. Press and hold the ID Pushbutton while plugging in the Ethernet / PoE connector. Begin counting only when the LEDs begin to flash (as opposed to the moment that the connector is inserted).

NOTE

A press-and-hold of the ID Pushbutton at boot will prevent the Module from attempting to come online until the pushbutton is released. The Module will only attempt to come online if the hold time is less than 10 seconds.

   Note that once the module has started booting up, all LEDs flash in unison at the rate of once per second. After 10 flashes at this rate, the LEDs will flash in unison at a faster rate.

2. At the point that the blink rate increases (approximately 10 seconds after boot-up), release the pushbutton.
3. The Module will automatically reboot to complete the process.

NOTE

When switching from Dynamic to Static IP using this method, the static IP address is set to the factory default IP Address, regardless of other static IP addresses that may have been set previously.

Resetting the Unit to the Factory Default Firmware Image

1. Press and hold the ID Pushbutton while plugging in the Ethernet / PoE connector. Begin counting only when the LEDs begin to flash (as opposed to the moment that the connector is inserted).

   Note that once the module has started booting up, all LEDs flash in unison at the rate of once per second. After 10 flashes at this rate, the LEDs will blink in unison at a faster rate.

   After 10 seconds of flashing at the increased rate, all LEDs go to solid on.
2. At the point that the LEDs go to solid on (approximately 20 seconds after boot-up), release the pushbutton.
3. The Module will restore itself to a factory firmware image by performing the following actions:
   a. Copy the boot code from the factory image to the boot block in flash memory.
   b. Mark the boot parameter block in flash memory to indicate that the unit should boot from slot#0 (the factory application code slot).
   c. Delete the application and boot code in flash memory slots #1 and #2.
   d. Delete the IRL files stored on the Module.

   While the button is held at boot (for at least 11 seconds), all LEDs on the Module continue to fast-blink.
4. Once all writes to flash memory are completed, the LEDs will all be extinguished, indicating that the unit is ready to reboot.
5. The Module will automatically reboot to complete the process.

Programming the EXB Modules

The EXB Modules support specific NetLinx CHANNELS, LEVELS and SEND_COMMANDs as well as a set of Telnet commands.

The CHANNELS, LEVELS and SEND_COMMANDs supported by each Module are described in the *NetLinx Programming* sections for each Module:

- EXB-COM2: See the *NetLinx Programming* section on page 19.
- EXB-REL8: See the *NetLinx Programming* section on page 36.
- EXB-IO8: See the *NetLinx Programming* section on page 22.
- EXB-IRS4: See the *NetLinx Programming* section on page 29.
- EXB-MP1: See the *NetLinx Programming* section on page 34.

Refer to the *Terminal (Telnet) Commands* section on page 53 section for detailed descriptions of the Telnet commands (supported by all EXB Modules).

EXB-COM2

Overview

The EXB-COM2 Networked COM2 Device (**FG2100-22**) provides 2 serial ports: one RS-232/422/485 port, and one RS-232 (only) port.

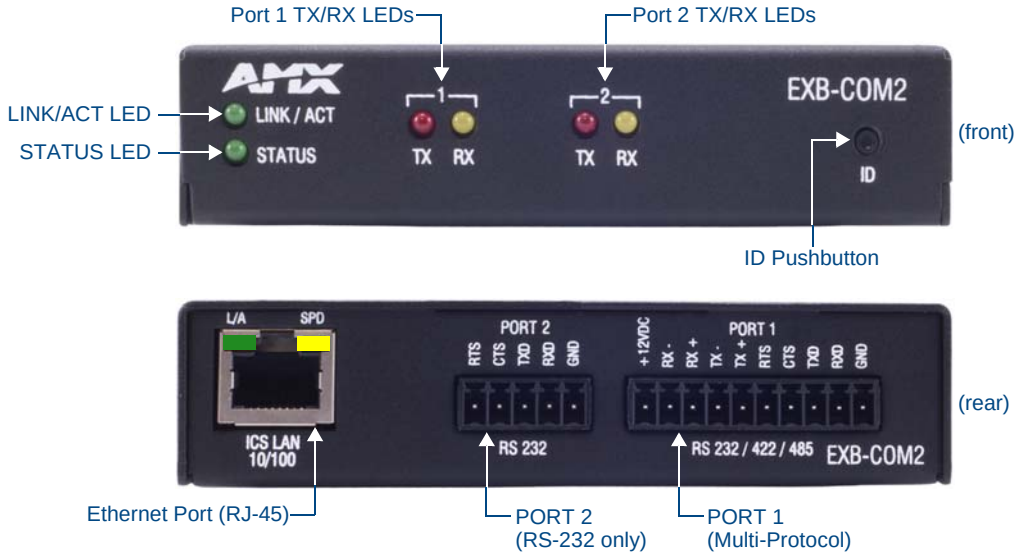


FIG. 6 EXB-COM2

EXB-COM2 Product Specifications

In addition to the features described in the ICSLan Device Control Boxes - Common Features table on page 2, the components and specifications listed below are specific to the EXB-COM2 module:

EXB-COM2 Specifications	
Power Requirements	
PoE (Power-over-Ethernet)	
Power Draw	• Idle (min): 40mA 1.92 watts • Busy (max): 40mA 1.92 watts
Front Panel Components	
Port 1 TX/RX LEDs	• Yellow (RX): indicates incoming activity on Port 1. • Red (TX): indicates outgoing activity on Port 1.
Port 2 TX/RX LEDs	• Yellow (RX): indicates incoming activity on Port 2. • Red (TX): indicates outgoing activity on Port 2.
Rear Panel Components	
RS232 Port	(Port 2) Connector: 3.5mm Phoenix – 5 position
RS232/422/485 Port	(Port 1) Connector: 3.5mm Phoenix – 10 position
Included Accessories	• 10-pin 3.5 mm mini-Phoenix (female) RS-232/422/485 connector (41-5107) • 5-pin 3.5 mm mini-Phoenix (female) RS-232 connector (41-0336)
Other AMX Equipment	• NXA-ENET8POE Gigabit Ethernet Switch (FG2178-62) • PS-POE-AF PoE Injector (FG423-80) • AVB-VSTYLE-SURFACE-MNT V-Style Module Surface Mount (FG1010-722) • AVB-VSTYLE-RMK-1U V-Style Module Tray (FG1010-720) • AVB-VSTYLE-RMK-FILL-1U V-Style Module Tray w/ fill plates (FG1010-721) • AVB-VSTYLE-POLE-MNT V Style Module Pole Mount (FG1010-723)

Connections and Wiring

LAN/PoE Port (RJ45)

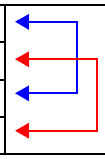
The LAN/PoE (RJ45) port on the rear panel provides 10/100 BaseT network connectivity. This port is common to all EXB Modules. Use standard Cat5/6/6E ethernet cable to connect the EXB Module to the LAN. Refer to the *LAN/PoE Port* section on page 7 for the pinout configuration for this port.

Port 1(Multi-Protocol COM Port)

Port 1 (multi-protocol port) on the rear panel is a 10-pin 3.5mm captive-wire connector that supports RS-232/422/485 serial communication. The following table describes the pinout configuration of Port 1:

EXB-COM2 Port 1 Pin Assignments

		Wiring Configuration			
Signal	Function	RS-232	RS-422	RS-485	
GND	Signal ground	X	X		
RXD	Receive data	X			
TXD	Transmit data	X			
CTS	Clear to send	X			
RTS	Request to send	X			
TX+	Transmit data		X	X	(strap to pin 8)
TX-	Transmit data		X	X	(strap to pin 9)
RX+	Receive data		X	X	(strap to pin 6)
RX-	Receive data		X	X	(strap to pin 7)
+12 VDC	Power (Max current 200 mA)	optional	optional		



Port 2 (RS-232 only)

Port 2 on the rear panel is a 5-pin 3.5mm captive-wire connector that supports RS-232 (only) serial communication. Pins 1-5 on COM2 provide the same RS-232 functions as pins 1-5 on the COM1 connector:

EXB-COM2 Port 2 Pin Assignments

Signal	Function
GND	Signal ground
RXD	Receive data
TXD	Transmit data
CTS	Clear to send
RTS	Request to send

NetLinx Programming

EXB-COM2 Port Assignments

EXB-COM2 Port Assignments	
Port	Description
1	COM Port 1
2	COM Port 2

EXB-COM2 SEND_COMMANDs

The following NetLinx SEND_COMMANDs are supported by the EXB-COM2 Module:

EXB-COM2 SEND_COMMANDs			
Command	Page Reference	Command	Page Reference
B9MOFF	page 37	**REBOOT**	page 44
B9MON	page 37	**RXCLR**	page 45
CHARD	page 38	**RXOFF**	page 45
CHARDM	page 38	**RXON**	page 45
CTSPSH	page 40	**SET BAUD**	page 45
CTSPSH OFF	page 40	**SET_NDX_DESC**	page 47
ESCSEQOFF	page 40	**TSET BAUD**	page 48
ESCSEQON	page 40	**TXCLR**	page 48
GET BAUD	page 40	**XOFF**	page 50
HSOFF	page 41	**XON**	page 50
HSON	page 41		
LED-DIS	page 42		
LED-EN	page 42		

SEND_STRING Escape Sequences

The EXB-COM2 and EXB-MP1 support several special SEND_STRING escape sequences. If any of the escape sequences are found anywhere within a SEND_STRING program instruction, they will be treated as a command and not the literal characters. See the *SEND_STRING Escape Sequences* section on page 51 for details.

Telnet commands

Refer to the *Terminal (Telnet) Commands* section on page 53 for a listing of all supported Telnet commands.

EXB-I/O8

Overview

The EXB-I/O8 Networked 8-I/O Device (**FG2100-21**) provides eight Input/Output channels with LED feedback. It acts as a logic-level input and responds to switch closures or voltage level (high/ low) changes.

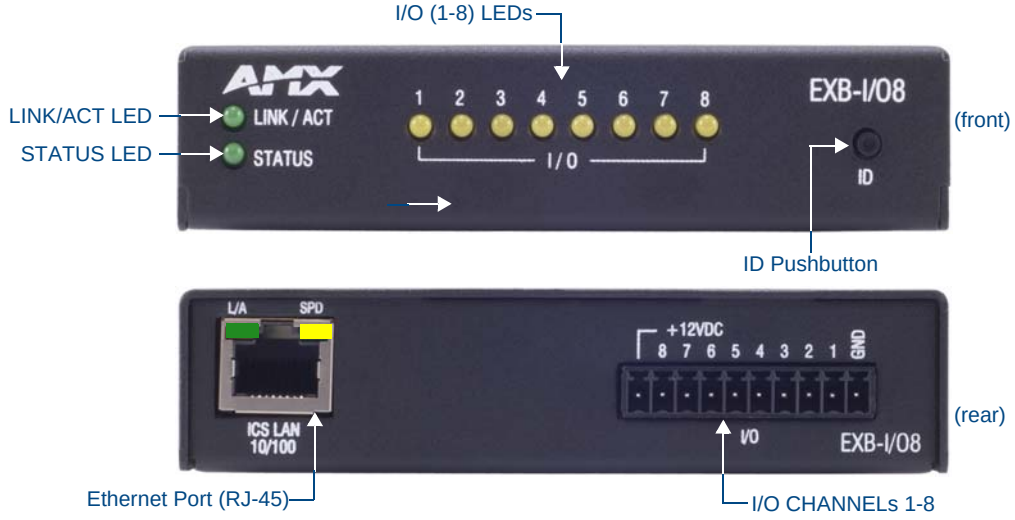


FIG. 7 EXB-I/O8

NOTE

The I/Os on this Module are not dry closure; they are electronic switches that float at 3V when Off. Therefore, they should not be expected to work in situations that require true dry contact (or dry closure). The I/Os do work with AMX PC1, PC2, UPC20 and UPC20+.

EXB-I/O8 Product Specifications

In addition to the features described in the ICSLan Device Control Boxes - Common Features table on page 2, the components and specifications listed below are specific to the EXB-I/O8 module:

EXB-I/O8 Specifications	
Power Requirements	
PoE (Power-over-Ethernet)	
Power Draw	• Idle (min): 30mA 1.44 watts • Busy (max): 40mA 1.92 watts
Front Panel Components	
I/O LEDs (1-8)	8 (yellow) LEDs light to indicate activity on I/O channels 1-8. ***Note**: Active = output high.*
Rear Panel Components	
I/O Ports (1-8)	Connector: 3.5mm Phoenix – 10-positions This connector is designated as Port 1, Channels 1-8
Included Accessories	• 10-pin 3.5 mm mini-Phoenix (female) I/O connector (41-5107)
Other AMX Equipment	• NXA-ENET8POE Gigabit Ethernet Switch (FG2178-62) • PS-POE-AF PoE Injector (FG423-80) • AVB-VSTYLE-SURFACE-MNT V-Style Module Surface Mount (FG1010-722) • AVB-VSTYLE-RMK-1U V-Style Module Tray (FG1010-720) • AVB-VSTYLE-RMK-FILL-1U V-Style Module Tray w/ fill plates (FG1010-721) • AVB-VSTYLE-POLE-MNT V Style Module Pole Mount (FG1010-723)

Connections and Wiring

LAN/PoE Port (RJ45)

The LAN/PoE (RJ45) port on the rear panel provides 10/100 BaseT network connectivity. This port is common to all EXB Modules. Use standard Cat5/6/6E ethernet cable to connect the EXB Module to the LAN. Refer to the *LAN/PoE Port* section on page 7 for the pinout configuration for this port.

Port 1 (I/O 1-8)

The I/O Connector on the rear panel is an 10-pin 3.5mm captive-wire connector that provides eight I/O contacts (1-8) as well as PWR and GND.

I/O8 Connector Pin Assignments	
Signal	Function
+12V	+12VDC (max current 200 mA)
8	Channel 8 – Voltage/current same as Channel 1
7	Channel 7 – Voltage/current same as Channel 1
6	Channel 6 – Voltage/current same as Channel 1
5	Channel 5 – Voltage/current same as Channel 1
4	Channel 4 – Voltage/current same as Channel 1
3	Channel 3 – Voltage/current same as Channel 1
2	Channel 2 – Voltage/current same as Channel 1
1	Channel 1
GND	Ground

- When used for voltage inputs, the I/O port detects a low signal (0 - 1.5 VDC) as a Push, and a high signal (3.3 - 5 VDC) as a Release.
- Although a high signal is defined as 3.3 - 5 VDC, this port can handle up to 12V without harm.
- When used for outputs, the I/O port acts as a switch to GND and is rated for 200mA @ 12 VDC.

The I/Os on this Module are not dry closure; they are electronic switches that float at 3V when Off. Therefore, they should not be expected to work in situations that require true dry contact (or dry closure). The I/Os do work with AMX PC1, PC2, UPC20 and UPC20+.

NetLinx Programming

EXB-IO8 Port Assignments

EXB-IO8 Port Assignments	
Port	Description
1	All I/Os (channels 1-8)

EXB-IO8 Channel Assignments

EXB-IO8 Channel Assignments	
Channel	Description
1-8	Channels 1-8 represent I/Os 1-8.

EXB-I/O8 SEND_COMMANDs

The following NetLinx SEND_COMMANDs are supported by the EXB-I/O8 Module:

EXB-I/O8 SEND_COMMANDs			
Command	Page Reference	Command	Page Reference
GET DBT	page 40	**SET DBT**	page 46
GET INPUT	page 41	**SET DBTF**	page 46
GET OFF DELAY	page 41	**SET INPUT**	page 46
GET ON DELAY	page 41	**SET_NDX_DESC**	page 47
LED-DIS	page 42	**SET OFF DELAY**	page 47
LED-EN	page 42	**SET ON DELAY**	page 47
REBOOT	page 44		

Telnet commands

Refer to the *Terminal (Telnet) Commands* section on page 53 for a listing of all supported Telnet commands.

EXB-IRS4

Overview

The EXB-IRS4 (**FG2100-23**) Networked IR & I/O Device provides four IR/Serial and four I/O ports.

The EXB-IRS4 supports all standard uses of these ports, including utilizing the I/O ports as monitor ports for the IR ports. Each port in the EXB-IRS4 stores programmed commands for IR- or serial-controlled devices.

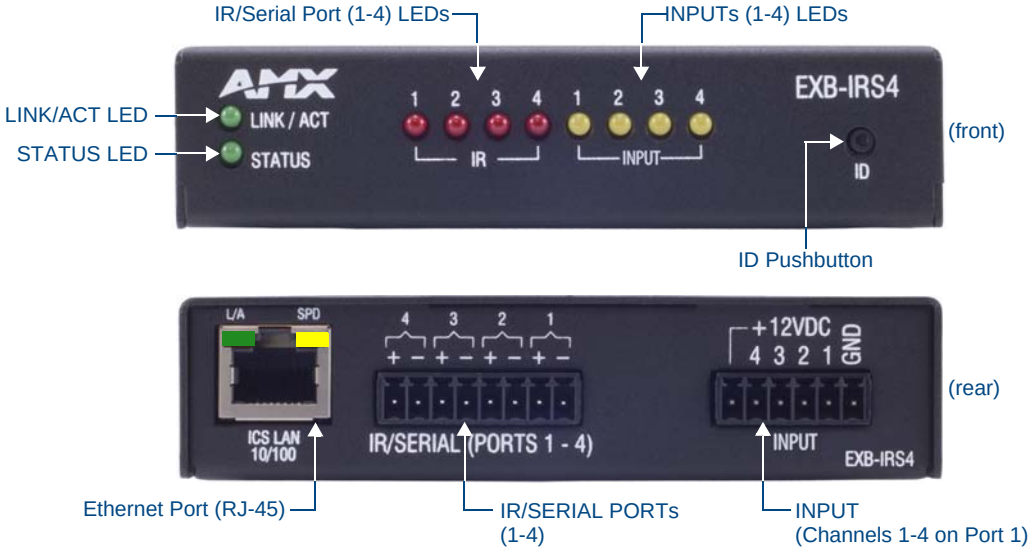


FIG. 8 EXB-IRS4

EXB-IRS4 Product Specifications

In addition to the features described in the ICSLan Device Control Boxes - Common Features table on page 2, the components and specifications listed below are specific to the EXB-IRS4 module:

EXB-IRS4 Specifications	
Power Requirements	
PoE (Power-over-Ethernet)	
Power Draw	• Idle (min): 40mA 1.92 watts • Busy (max): 50mA 2.4 watts
Front Panel Components	
IR/Serial 1-4 TX LEDs	4 (red) LEDs indicate outgoing (TX) activity on Ports 1-4.
Input RX LEDs	4 (yellow) LEDs indicate incoming (RX) activity on PortS 1-4.
Rear Panel Components	
IR/Serial Ports	Connector: 3.5mm Phoenix – 8 position. This connector contains Ports 1-4.
Input Port	Connector: 3.5mm Phoenix – 6 position. This is the connector for I/O inputs 1-4. See the *NetLinx Programming* section on page 29 for more information about port and channel assignments.
Included Accessories	• 6-pin 3.5 mm mini-Phoenix female Input connector (41-5063) • Two CC-NIRC IR Emitters
Other AMX Equipment	• NXA-ENET8POE Gigabit Ethernet Switch (FG2178-62) • PS-POE-AF PoE Injector (FG423-80) • AVB-VSTYLE-SURFACE-MNT V-Style Module Surface Mount (FG1010-722) • AVB-VSTYLE-RMK-1U V-Style Module Tray (FG1010-720) • AVB-VSTYLE-RMK-FILL-1U V-Style Module Tray w/ fill plates (FG1010-721) • AVB-VSTYLE-POLE-MNT V Style Module Pole Mount (FG1010-723)

Connections and Wiring

LAN/PoE Port (RJ45)

The LAN/PoE (RJ45) port on the rear panel provides 10/100 BaseT network connectivity. This port is common to all EXB Modules. Use standard Cat5/6/6E ethernet cable to connect the EXB Module to the LAN. Refer to the *LAN/PoE Port* section on page 7 for the pinout configuration for this port.

IR/Serial Port Bank (Ports 1-4)

The IR/Serial Port Bank on the rear panel is an 8-pin 3.5mm captive-wire connector that supports up to four (optional) CC-NIRC IR Emitters.

IR/Serial Connector Pin Assignments			
Signal	Function	Signal	Function
4 +	IR/Serial port 4 +	**2 +**	IR/Serial port 2 +
4 -	IR/Serial port 4 -	**2 -**	IR/Serial port 2 -
3 +	IR/Serial port 3 +	**1 +**	IR/Serial port 1 +
3 -	IR/Serial port 3 -	**1 -**	IR/Serial port 1 -

Input Port Bank

The Input Port Bank on the rear panel is an 6-pin 3.5mm captive-wire connector that supports up to four (optional) CC-NIRC IR Emitters.

The Input channel detects a low signal (0 - 1.5 VDC) as a Push, and a high signal (3.3 - 5 VDC) as a Release.

I/O Connector Pin Assignments	
Signal	Function
+12VDC	+12VDC (max current 200 mA)
4	Port 4, Channel 255
3	Port 3, Channel 255
2	Port 2, Channel 255
1	Port 1, Channel 255
GND	Ground

Although a high signal is defined as 3.3 – 5 VDC, this port can handle up to 12V without harm.

The maximum baud rate for ports using DATA mode is 19200. Also, DATA mode works best when using a short cable length (< 10 feet).

Input Linking

The EXB-IRS4 has 4 IR-Tx ports (labelled "IR/SERIAL") and 4 associated input pins. Each of the 4 input pins is directly associated with one IR-Tx port. Port #1 is associated with input pin #1 and so on.

Any of the 4 IR-Tx ports/pins on an EXB-IRS4 can be run in either “unlinked” or “linked” mode:

Unlinked Mode (Default)

Unlinked mode is the default mode at boot up. When an IR/SERIAL port is unlinked the input pin state has no effect on the IR-Tx port.

Linked Mode

Linked mode is intended to provide the function of a “light switch” for the power state of a television via the EXB-IRS4’s IR interface.

When a port is linked, the power state (on/off) of the TV is sensed via the input pin and factored into the logic of whether or not to send power on/off IR pulses out the port to the TV. In this way, even a TV with a simple power toggle IR code can be reliably turned on and off by the EXB-IRS4.

When in linked mode, the IR/SERIAL port is in one of 3 mutually exclusive states: **POD**, **PON** or **POF** (see the IO-Linked Modes table on page 28).

Input Pin

The firmware on the EXB-IRS4 senses the high/low state of the pin and always reports that state to the master via PUSH/RELEASE messages on ports 1-4 channel 255. This behavior persists regardless of whether the pin is linked or unlinked.

Entering/Exiting Linked Mode

Linked mode is entered by sending the “SET INPUT LINK” command (see page 46) to a specific [D:P:S].

The EXB-IRS4 firmware will accept a port number from 1 to 4 and will enable linked mode on that port.

Linked Modes

The following table describes the four linking modes on the EXB-IRS4:

IO-Linked Modes	
Unlinked *(default)*	• Exited by **SET INPUT LINK <port>** (see *SET INPUT LINK* on page 46) • LEDs reflect the power state of the 4 input pins • Channel 255 reports the power state of the 4 input pins on their default port# • All POD (page 42), PON (page 43), POF (page 43) messages are ignored • No IR activity due to pin state
POD *(default linked state)*	In POD state, the PON/POF behavior is disabled and the state of the input pin is not used to trigger the sending of power on/off pulses. This is the default state of a linked port upon receiving the "SET INPUT LINK" command. • Exited by **PON** (page 43), **POF** (page 43), or **SET INPUT LINK 0** (page 46) • LEDs reflect the power state of the 4 input pins • Channel 255 reports the power state of the 4 input pins on their linked port#(s) • PON, POF messages are applied • No IR activity due to pin state
PON	In the PON state, the IR/SERIAL port is used to keep the TV powered on. When in PON state, if the TV is sensed via the input pin to be off, power-on pulses are sent out the IR/SERIAL port until the TV is sensed to be on. • Exited by **POD** (page 42), **POF** (page 43), or **SET INPUT LINK 0** (page 46) • LEDs reflect the power state of the 4 input pins • Channel 255 reports the power state of the 4 input pins on their linked port#(s) • POD, POF messages are applied • IR activity to maintain power ON pin state ***Note**: When an IR/SERIAL port is linked and in PON state, the time delay set by the PTON Send Command (see page 44) is used for power pulses sent out the port.*
POF	In the POF state, the IR/SERIAL port is used to keep the TV powered off. When in POF state, if the TV is sensed via the input pin to be on, power-off pulses are sent out the IR/SERIAL port until the TV is sensed to be off. • Exited by **PON** (page 43), **POD** (page 42), or **SET INPUT LINK 0** (page 46) • LEDs reflect the power state of the 4 input pins • Channel 255 reports the power state of the 4 input pins on their linked port#(s) • POD, PON messages are applied • IR activity to maintain power OFF pin state ***Note**: When an IR/SERIAL port is linked and in POF state, the time delay set by the PTOF Send Command (see page 44) is used for power pulses sent out the port.*

NetLinx Programming

EXB-IRS4 Port Assignments

EXB-IRS4 Port Assignments	
Port	Description
1	IR/Serial Port 1 and Input 1
2	IR/Serial Port 2 and Input 2
3	IR/Serial Port 3 and Input 3
4	IR/Serial Port 4 and Input 4

EXB-IRS4 Channel Assignments

EXB-IRS4 Channel Assignments	
Channel	Description
1 - 229	IR commands. If the EXB-IRS4 receives a channel code below 230 and it doesn't exist in the IR data, then it will send a channel off command back to the master as a NAK mechanism.
230 - 253	If the EXB-IRS4 receives a channel code >= 230 and <=253 and it doesn't exist in the IR data, then it will fail silently (NetLinx uses the feedback channels for other purposes.
254	Used for feedback w/ 'PON' and 'POF' commands. If the EXB-IRS4 receives from the master a channel code of 254, and it doesn't exist in the IR data, then it fails silently.
255	Power status. (Shadows I/O Link channel status). If the EXB-IRS4 receives from the master a channel code of 255 and it doesn't exist in the IR data, then it will fail silently.

The EXB-IRS4 can process up to two IR or serial device channel setting commands simultaneously.

EXB-IRS4 SEND_COMMANDs

The following NetLinx SEND_COMMANDs are supported by the EXB-IRS4Module:

EXB-IRS4 SEND_COMMANDs			
Command	Page Reference	Command	Page Reference
CAROFF	page 37	**PON**	page 43
CARON	page 37	**PTOF**	page 44
CH	page 38	**PTON**	page 44
CP	page 39	**REBOOT**	page 44
CTOF	page 39	**SET_NDX_DESC**	page 47
CTON	page 39	**SET BAUD**	page 45
GET BAUD	page 40	**SET DBT**	page 46
GET MODE	page 41	**SET INPUT LINK**	page 46
IROFF	page 42	**SET IO LINK**	page 46
LED-DIS	page 42	**SET MODE**	page 47
LED-EN	page 42	**SP**	page 48
POD	page 42	**XCH**	page 49
POF	page 43	**XCHM**	page 49

Telnet commands

Refer to the *Terminal (Telnet) Commands* section on page 53 for a listing of all supported Telnet commands.

EXB-MP1

Overview

The EXB-MP1Networked Television Control System Device (**FG2100-26**) provides one Serial (RS-232) port, one I/O port, one IR (TX) and one IR (RX) port (FIG. 9).

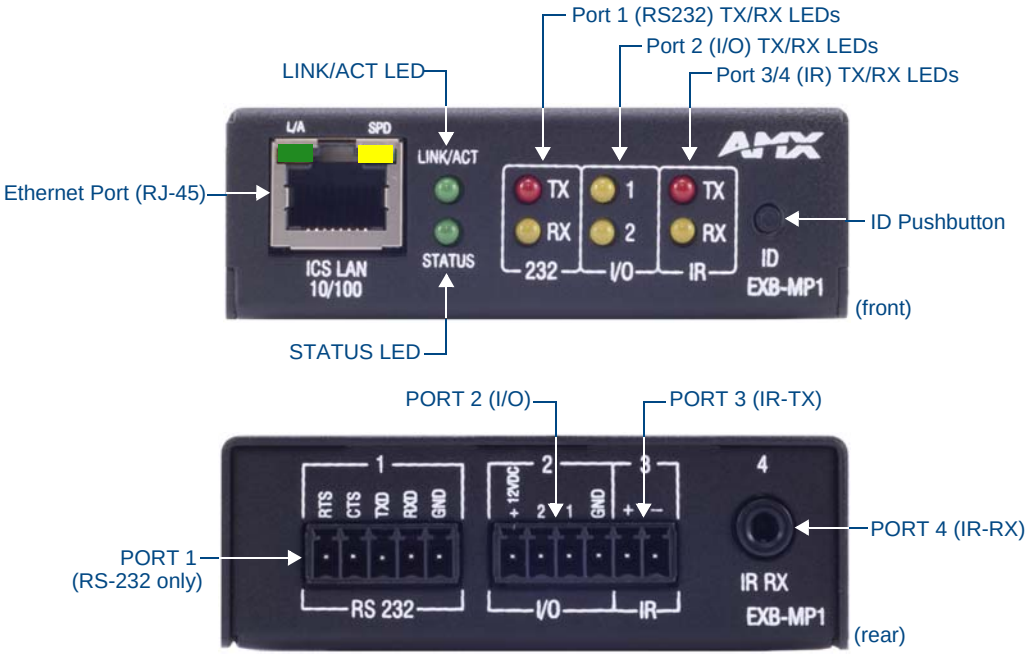


FIG. 9 EXB-MP1

EXB-MP1 Product Specifications

In addition to the features described in the ICSLan Device Control Boxes - Common Features table on page 2, the components and specifications listed below are specific to the EXB-MP1 module:

EXB-MP1 Specifications	
Power Requirements	
PoE (Power-over-Ethernet)	
Power Draw	• Idle (min): 40mA 1.92 watts • Busy (max): 40mA 1.92 watts
Front Panel Components	
Ethernet / PoE Connector	RJ-45 connector provides TCP/IP communication and PoE. This is an Auto MDI/MDI-X enabled port, therefore either straight-through or crossover Ethernet cables can be used.
232 TX/RX LEDs	2 LEDs light to indicate incoming (RX- yellow) and outgoing (TX - red) activity on the Serial port (Port 1).
I/O (1 & 2) LEDs	2 (yellow) LEDs light to indicate which channels (1-2) are active (output high) on the I/O port (Port 2).
IR TX/RX LEDs	2 LEDs light to indicate incoming (RX - yellow) and outgoing (TX - red) activity on the IR Port. • Port 3 = IR Transmit (TX) • Port 4 = IR Receive (RX)

EXB-MP1 Specifications (Cont.)	
Rear Panel Components	
RS232 Port (Port 1)	Connector: 3.5mm Phoenix – 5 position (Serial RS232 only)
I/O Port (Port 2)	Connector: 3.5mm Phoenix – 4 position
IR-TX/Serial Port (Port 3)	Connector: 3.5mm Phoenix – 2 position
IR-RX Port (Port 4)	Connector: 1/8th inch (6.35 mm) TRS connector
Included Accessories	• CC-NIRC IR Emitter • 5-pin 3.5 mm mini-Phoenix (female) RS-232 connector (41-0336) • 4-pin 3.5 mm mini-Phoenix (female) I/O connector (41-5047)
Other AMX Equipment	• IR03 External IR Receiver Module (FG-IR03) • NXA-ENET8POE Gigabit Ethernet Switch (FG2178-62) • PS-POE-AF PoE Injector (FG423-80) • AVB-VSTYLE-SURFACE-MNT V-Style Module Surface Mount (FG1010-722) • AVB-VSTYLE-RMK-1U V-Style Module Tray (FG1010-720) • AVB-VSTYLE-RMK-FILL-1U V-Style Module Tray w/ fill plates (FG1010-721) • AVB-VSTYLE-POLE-MNT V Style Module Pole Mount (FG1010-723)

NOTE

Refer to the Common Features section on page 2 *for product specifications common to all EXB Modules.*

Connections and Wiring

LAN/PoE Port (RJ45)

The LAN/PoE (RJ45) port on the front panel provides 10/100 BaseT network connectivity. Use standard Cat5/6/6E ethernet cable to connect the EXB Module to the LAN. Refer to the *LAN/PoE Port* section on page 7 for the pinout configuration for this port.

Port 1 (RS-232 only)

Port 1 on the rear panel is a 5-pin 3.5mm captive-wire connector that supports RS-232 (only) serial communication.

EXB-MP1 Port 1 Pin Assignments	
Signal	Function
RTS	Request to send
CTS	Clear to send
TXD	Transmit data
RXD	Receive data
GND	Signal ground

Port 2 (I/O)

Port 2 on the rear panel is an 4-pin 3.5mm captive-wire connector that provides two I/O contacts (1-2) as well as PWR and GND.

EXB-MP1 Port 2 Pin Assignments	
Signal	Function
+12VDC	+12VDC (max current 200 mA)
2	Channel 2 - Same as Channel 1.
1	Channel 1
GND	Ground

- When used for voltage inputs, the I/O port detects a low signal (0 - 1.5 VDC) as a Push, and a high signal (3.3 - 5 VDC) as a Release.
- Although a high signal is defined as 3.3 - 5 VDC, this port can handle up to 12V without harm.
- When used for outputs, the I/O port acts as a switch to GND and is rated for 200mA @ 12 VDC.

The I/Os on this Module are not dry closure; they are electronic switches that float at 3V when Off. Therefore, they should not be expected to work in situations that require true dry contact (or dry closure). The I/Os do work with AMX PC1, PC2, UPC20 and UPC20+.

Port 3 (IR-TX/Serial)

Port 3 on the rear panel is an 2-pin 3.5mm captive-wire IR-TX connector that supports one (optional) CC-NIRC IR Emitter.

EXB-MP1 Port 3 Pin Assignments

Signal	Function
+	IR/Serial port 1 +
-	IR/Serial port 1 -

Port 4 (IR-RX)

Port 4 on the rear panel is a 1/8th inch (6.35 mm) IR-RX (TRS) connector.

The maximum baud rate for ports using DATA mode is 19200. Also, DATA mode works best when using a short cable length (< 10 feet).

NetLinx Programming

EXB-MP1 SEND_COMMANDs

The following NetLinx SEND_COMMANDs are supported by the EXB-MP1 Module:

EXB-MP1 SEND_COMMANDs			
Command	Page Reference	Command	Page Reference
B9MOFF	page 37	**LED-DIS**	page 42
B9MON	page 37	**LED-EN**	page 42
CAROFF	page 37	**REBOOT**	page 44
CARON	page 37	**RXCLR**	page 45
CH	page 38	**RXOFF**	page 45
CHARD	page 38	**RXON**	page 45
CHARDM	page 38	**SET_NDX_DESC**	page 47
CP	page 39	**SET BAUD**	page 45
CTOF	page 39	**SET DBT**	page 46
CTON	page 39	**SET DBTF**	page 46
CTSPSH	page 40	**SET INPUT**	page 46
CTSPSH OFF	page 40	**SET MODE**	page 47
ESCSEQOFF	page 40	**SET OFF DELAY**	page 47
ESCSEQON	page 40	**SET ON DELAY**	page 47
GET BAUD	page 40	**SP**	page 48
GET DBT	page 40	**TSET BAUD**	page 48
GET INPUT	page 41	**TXCLR**	page 48
GET MODE	page 41	**XCH**	page 49
GET OFF DELAY	page 41	**XCHM**	page 49
GET ON DELAY	page 41	**XOFF**	page 50
HSOFF	page 41	**XON**	page 50
HSON	page 41		
IROFF	page 42		

SEND_STRING Escape Sequences

The EXB-COM2 and EXB-MP1 support several special SEND_STRING escape sequences. If any of the escape sequences are found anywhere within a SEND_STRING program instruction, they will be treated as a command and not the literal characters.

See the *SEND_STRING Escape Sequences* section on page 51 for details.

Telnet commands

Refer to the *Terminal (Telnet) Commands* section on page 53 for a listing of all supported Telnet commands.

EXB-REL8

Overview

The EXB-REL8 Networked 8-Relay Device (**FG2100-20**) provides eight relays that support devices that employ simple momentary or latching contact-closure control, with LED feedback.

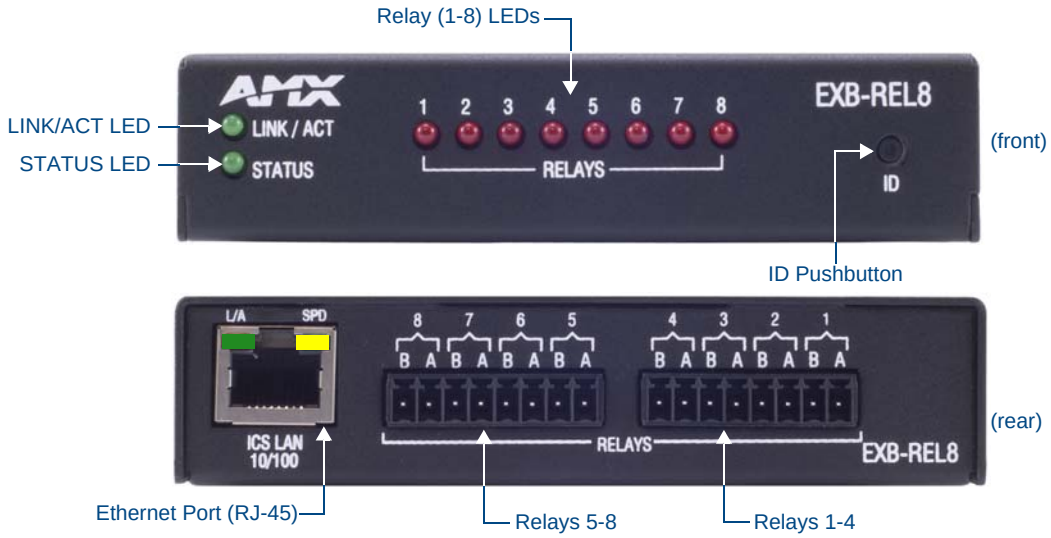


FIG. 10 EXB-REL8

EXB-REL8 Product Specifications

In addition to the features described in the ICSLan Device Control Boxes - Common Features table on page 2, the EXB-REL8 module features the following components:

EXB-REL8 Specifications	
Power Requirements	
PoE (Power-over-Ethernet)	
Power Draw:	• Idle (min): 40mA 1.92 watts • Busy (max): 70mA 3.36 watts
Front Panel Components	
Relay LEDs (1-8)	8 (red) LEDs light to indicate which relays 1-8 are active (active = contacts closed).
Rear Panel Components	
1 Relay Port	Connector: 3.5mm Phoenix – 16 positions. This port is designated as Port 1, Channels 1-8
Included Accessories	• Two 8-pin 3.5 mm mini-Phoenix female Relay connectors (41-5083) • 8-position Commoning Strip for 3.5mm mini-Phoenix (41-2105-01)
Other AMX Equipment	• NXA-ENET8POE Gigabit Ethernet Switch (FG2178-62) • PS-POE-AF PoE Injector (FG423-80) • AVB-VSTYLE-SURFACE-MNT V-Style Module Surface Mount (FG1010-722) • AVB-VSTYLE-RMK-1U V-Style Module Tray (FG1010-720) • AVB-VSTYLE-RMK-FILL-1U V-Style Module Tray w/ fill plates (FG1010-721) • AVB-VSTYLE-POLE-MNT V Style Module Pole Mount (FG1010-723)

Connections and Wiring

LAN/PoE Port (RJ45)

The LAN/PoE (RJ45) port on the rear panel provides 10/100 BaseT network connectivity. This port is common to all EXB Modules. Use standard Cat5/6/6E ethernet cable to connect the EXB Module to the LAN. Refer to the *LAN/PoE Port* section on page 7 for the pinout configuration for this port.

Port 1 (Relay Connector)

The Relay Connectors on the rear panel are two 8-pin 3.5mm captive-wire connectors that provide A and B connections for eight SPST Relay channels (1-8).

- Connectors labeled **A** for Common, **B** for Output.
- These relays are independently controlled, isolated and normally open.
- The relay contacts are rated for a maximum of 1 A @ 0-24 VAC or 0-28 VDC (resistive).

Relay Connector Pinouts

First Relay Connector Pinout		Second Relay Connector Pinout	
Pin	**Description**	**Pin**	**Description**
1	Channel 1A	**1**	Channel 5A
2	Channel 1B	**2**	Channel 5B
3	Channel 2A	**3**	Channel 6A
4	Channel 2B	**4**	Channel 6B
5	Channel 3A	**5**	Channel 7A
6	Channel 3B	**6**	Channel 7B
7	Channel 4A	**7**	Channel 8A
8	Channel 4B	**8**	Channel 8B

An 8-position metal Commoning Strip (41-2105-01) is provided with each EXB-REL8 to common multiple relays.

NetLinx Programming

EXB-REL8 Port Assignments

EXB-REL8 Port Assignments

Port	Description
1	All Relays (channels 1-8)

EXB-REL8 Channel Assignments

EXB-REL8 Channel Assignments

Channel	Description
1-8	Channels 1-8 represent Relays 1-8.

EXB-REL8 SEND_COMMANDs

The following NetLinx SEND_COMMANDs are supported by the EXB-REL8 Module:

EXB-REL8 SEND_COMMANDs

Command	Page Reference	Command	Page Reference
LED-DIS	page 42	**REBOOT**	page 44
LED-EN	page 42	**SET_NDX_DESC**	page 47

Telnet commands

Refer to the *Terminal (Telnet) Commands* section on page 53 for a listing of all supported Telnet commands.

NetLinx Send Commands

The following NetLinx SEND_COMMANDs are supported by the EXB-xxx modules.

NetLinx Send Commands		
Command	**Description**	**EXB Modules**

B9MOFF	Set the port's communication parameters for stop and data bits according to the software settings on the RS-232 port (default).
	• Disables 9-bit in 232/422/455 mode.
	• By default, this returns the Communication settings on the serial port to the last programmed parameters.
	• This command works in conjunction with the 'B9MON' command.
	Syntax:
	`B9MOFF`
	Example:
	`SEND_COMMAND SOMEDEVICE_1,"'B9MOFF'"`
	Sets the port settings on SOMEDEVICE to match the port's configuration settings.
		• EXB-COM2
		• EXB-MP1

B9MON	Override and set the current communication settings and parameters on the RS-232 serial port to 9 data bits with one stop bit.
	• Enables 9-bit in 232/422/485 mode.
	• This command works in conjunction with the 'B9MOFF' command.
	Syntax:
	`B9MON`
	Example:
	`SEND_COMMAND SOMEDEVICE_1,"'B9MON'"`
	Resets the SOMEDEVICE port's communication parameters to nine data bits and one stop bit.
		• EXB-COM2
		• EXB-MP1

CAROFF	Disable the IR carrier signal until a 'CARON' command is received.
	Syntax:
	`CAROFF`
	Example:
	`SEND_COMMAND IR_1,"'CAROFF'"`
	Stops transmitting IR carrier signals to the IR_1 port.
		• EXB-IRS4
		• EXB-MP1

CARON	Enable the IR carrier signals (default).
	Syntax:
	`CARON`
	Example:
	`SEND_COMMAND IR_1,"'CARON'"`
	Starts transmitting IR carrier signals to the IR_1 port.
		• EXB-IRS4
		• EXB-MP1

NetLinx Send Commands (Cont.)		
Command	**Description**	**EXB Modules**
CH	Send IR pulses for the selected a channel. • All channels below 100 are transmitted as two digits. If the IR code for ENTER (function #21) is loaded, an Enter will follow the number. • If the channel is greater than or equal to (>=) 100, then IR function 127 or 20 (whichever exists) is generated for the one hundred digit. • This command uses a binary parameter. To generate a Send Command of this type, use string expressions, such as: "'CH',$01". ***Note**: Set the Pulse and Wait times with 'CTON' (page 39) and 'CTOF' (page 39).* Syntax: 'CH',<Channel Number> Variable: channel number = 0 - 199. Example: SEND_COMMAND IR_1,"'CH',$18" The EXB-IRS4 performs the following: • Transmits IR signals for 1 (IR code 11). The transmit time is set with the CTON command. • Waits until the time set with the CTOF command elapses. • Transmits IR signals for 8 (IR code 18). • Waits for the time set with the CTOF command elapses. If the IR code for Enter (IR code 21) is programmed, the IRS4 performs the following steps. • Transmits IR signals for Enter (IR code 21). • Waits for the time set with the CTOF command elapses.	• EXB-IRS4 • EXB-MP1
CHARD	Set the delay time between all transmitted characters to the value specified (in 100 microsecond increments). Syntax: CHARD-<time> Variable: time: 0 - 10000 (1 second) Example: SEND_COMMAND RS232_1,"'CHARD-10'" Sets a 1-millisecond delay between all transmitted characters.	• EXB-COM2 • EXB-MP1
CHARDM	Set the delay time between all transmitted characters to the value specified (in 1 millisecond increments). Syntax: CHARDM-<time> Variable: time: 0 - 1000 (1 second) Example: SEND_COMMAND RS232_1,"'CHARDM-10'" Sets a 10-millisecond delay between all transmitted characters.	• EXB-COM2 • EXB-MP1

NetLinx Send Commands (Cont.)		
Command	**Description**	**EXB Modules**
CP	Halt and clear all active or buffered IR commands, and then send a single IR pulse. • This command uses a binary parameter. To generate a Send Command of this type, use string expressions, such as: "'CH',$01". ***Note**: Set the Pulse and Wait times with 'CTON' and 'CTOF'.* Syntax: 'CP',<code> Variable: code = IR port's channel value 0 - 252 (253 - 255 reserved). Example: SEND_COMMAND IR_1,"'CP',$02" Clears the active/buffered commands and pulses IR_1 port's channel 2.	• EXB-IRS4 • EXB-MP1
CTOF	Set the duration of the Off time (no signal) between IR pulses for channel and IR function transmissions. • Sets the delay time between pulses generated by the 'CH' or 'XCH' Send Commands in tenths of seconds. • Off time settings are stored in non-volatile memory. • This command uses a binary parameter. To generate a Send Command of this type, use string expressions, such as: "'CH',$01". Syntax: 'CTOF',<time> Variable: time = 0 - 255. Given in 1/10ths of a second. Default is 5 (0.5 seconds). Example: SEND_COMMAND IR_1,"'CTOF',10" Sets the Off time between each IR pulse to 1 second.	• EXB-IRS4 • EXB-MP1
CTON	Set the total time of IR pulses transmitted and is stored in non-volatile memory. • This command sets the pulse length for each pulse generated by the 'CH' (page 38) or 'XCH' (page 49) Send Commands in tenths of seconds. • This command uses a binary parameter. To generate a Send Command of this type, use string expressions, such as: "'CH',$01". Syntax: 'CTON',<time> Variable: time = 0 - 255. Given in 1/10ths of a second. Default is 5 (0.5 seconds). Example: SEND_COMMAND IR_1,"'CTON',20" Sets the IR pulse duration to 2 seconds.	• EXB-IRS4 • EXB-MP1

NetLinx Send Commands (Cont.)		
Command	**Description**	**EXB Modules**

CTSPSH	Enable Pushes, Releases, and status information to be reported via channel 255 using the CTS hardware handshake input.
	***Note**: If Clear To Send (CTS) is high, the channel is ON.*
	Syntax:
	`CTSPSH`
	Example:
	`SEND_COMMAND RS232_1,"'CTSPSH'"`
	Sets the RS232_1 port to detect changes on the CTS input.
	***Note**: Channel 255 (on each port) reflects the state of the CTS input if a 'CTSPSH' command was sent to the port.*
		• EXB-COM2
		• EXB-MP1

CTSPSH OFF	Disable Pushes, Releases, and Status information to be reported via channel 255.
	• Turns CTSPSH Off.
	***Note**: If Clear To Send (CTS) is high, the channel is ON.*
	Syntax:
	`CTSPSH OFF`
	Example:
	`SEND_COMMAND RS232_1,"'CTSPSH OFF'"`
	Turns off CTSPSH for the specified device.
	Disables the RS232_1 port to detect changes on the CTS input.
	***Note**: Channel 255 (on each port) reflects the state of the CTS input if a 'CTSPSH' command was sent to the port.*
		• EXB-COM2
		• EXB-MP1

ESCSEQOFF	Disables SEND_STRING escape sequences (see the *SEND_STRING Escape Sequences* section on page 51).	• EXB-COM2 • EXB-MP1
ESCSEQON	Enables SEND_STRING escape sequences (see the *SEND_STRING Escape Sequences* section on page 51).	• EXB-COM2 • EXB-MP1

GET BAUD	Get the RS-232/422/485 port's current communication parameters.
	The port sends the parameters to the device that requested the information.
	Syntax:
	`GET BAUD`
	Example:
	`SEND_COMMAND RS232_1,"'GET BAUD'"`
	The port responds with:
	`<port #>,<baud>,<parity>,<data>,<stop> 485 <ENABLED|DISABLED>`
		• EXB-COM2
		• EXB-IRS4
		• EXB-MP1

GET DBT	Returns current debounce value.
	Syntax:
	`SEND_COMMAND <DEV>,"'GET DBT'"`
	Example:
	`SEND_COMMAND DEVICE_1,"'GET DBT'"`
	Returns current debounce value for DEVICE_1.
		• EXB-I/O8
		• EXB-MP1

NetLinx Send Commands (Cont.)		
Command	**Description**	**EXB Modules**

GET INPUT	Get the active state for the selected channels.
	An active state can be high (logic high) or low (logic low or contact closure). Channel changes, Pushes, and Releases generate reports based on their active state.
	The port responds with either 'HIGH' or 'LOW'.
	Syntax:
	`GET INPUT <channel>`
	Variable:
	channel = Input channel 1 - 8.
	Example:
	`SEND_COMMAND IO,"'GET INPUT 1'"`
	Gets the I/O port's active state.
	The system could respond with:
	`INPUT1 ACTIVE HIGH`
		• EXB-I/O8
		• EXB-IRS4
		• EXB-MP1

GET MODE	Poll the IR/Serial port's configuration parameters and report the active mode settings to the device requesting the information.
	Syntax:
	`GET MODE`
	The port responds with:
	`<port #> <mode>,<carrier>,<io link channel>.`
	Example:
	`SEND_COMMAND IR_1,"'GET MODE"`
	The system could respond with:
	`PORT 4 IR,CARRIER,IO LINK 0`
		• EXB-IRS4
		• EXB-MP1

GET OFF DELAY	Returns the off delay for the specified port and channel in a STRING message. See SET OFF DELAY. Syntax: `GET OFF DELAY <chan>`	• EXB-I/O8 • EXB-MP1
GET ON DELAY	Returns the on delay for the specified port and channel in a STRING message. See SET ON DELAY. Syntax: `GET ON DELAY <chan>`	• EXB-I/O8 • EXB-MP1

HSOFF	Disable hardware handshaking (default).
	***Note**: RTS is asserted by default. Controlled by escape sequences described in the SEND_STRING Escape Sequences* section on page 51.
	Syntax:
	`HSOFF`
	Example:
	`SEND_COMMAND RS232_1,"'HSOFF'"`
	Disables hardware handshaking on the RS232_1 device.
		• EXB-COM2
		• EXB-MP1

HSON	Enable RTS (ready-to-send) and CTS (clear-to-send) hardware handshaking.
	***Note**: RTS / CTS handshaking signals operate even if 485 is enabled.*
	Syntax:
	`HSON`
	Example:
	`SEND_COMMAND RS232_1,"'HSON'"`
	Enables hardware handshaking on the RS232_1 device.
		• EXB-COM2
		• EXB-MP1

NetLinx Send Commands (Cont.)		
Command	**Description**	**EXB Modules**

IROFF	Halt and Clear all active or buffered IR commands being output on the designated port.
	Syntax:
	`IROFF`
	Example:
	`SEND_COMMAND IR_1,"'IROFF"`
	Immediately halts and clears all IR output signals on the IR_1 port.
		• EXB-IRS4
		• EXB-MP1

LED-DIS	Disable LEDs.
	Syntax:
	`LED-DIS`
	Example:
	`SEND_COMMAND DEVICE_1,"'LED-DIS'"`
	Disables LEDs on DEVICE_1.
	***Note**: This parameter does not get stored in non-volatile memory. LEDs are enabled by default at each power-up.*
		All EXB Modules

LED-EN	Enable LEDs (default).
	Syntax:
	`LED-EN`
	Example:
	`SEND_COMMAND DEVICE_1,"'LED-EN'"`
	Enables LEDs on DEVICE_1.
		All EXB Modules

POD	Disable previously active 'PON' (power on) or 'POF' (power off) command settings.
	• Channel 255 changes are enabled.
	• This command is used in conjunction with the SET IO LINK command (page 46).
	Syntax:
	`POD`
	Example:
	`SEND_COMMAND IR_1,"'POD"`
	Disables the 'PON' and 'POF' command settings on the IR_1 device.
		EXB-IRS4

NetLinx Send Commands (Cont.)		
Command	**Description**	**EXB Modules**

POF	Turn OFF a device connected to an IR port based on the status of the corresponding I/O Link input.
	• If at any time the IR sensor input reads that the device is ON (as in having been manually turned on at the front panel), IR function 28 (if available) or IR function 9 is automatically generated in an attempt to turn the device back OFF.
	• If three attempts fail, the IR port will continue executing commands in the buffer.
	• If there are no commands in the buffer, the IR port will continue executing commands in the buffer and trying to turn the device OFF until a 'PON' or 'POD' command is received.
	• If the IR port fails to turn the device OFF, a PUSH and RELEASE is made on channel 254 to indicate a power failure error.
	• You can only use the 'PON' and 'POF' commands when an IR device has a linked I/O channel.
	• Channel 255 changes are disabled after receipt of this command.
	Syntax:
	`POF`
	Example:
	`SEND_COMMAND IR_1,"'POF'"`
	Sends power down IR commands 28 (if present) or 9 to the IR_1 device.
	***Note**: When an IR/SERIAL port is linked and in POF state, the time delay set by the PTOF Send Command (page 44) is used for power pulses sent out the port. See the Input Linking* section on page 27 *for details.*
		EXB-IRS4

PON	Turn ON a device connected to an IR port based on the status of the corresponding I/O Link input.
	• If at any time the IR sensor input reads that the device is OFF (such as if one turned it off manually at the front panel), IR function 27 (if available) or IR function 9 is automatically generated in an attempt to turn the device back ON.
	• If three attempts fail, the IR port will continue executing commands in the buffer and trying to turn the device On.
	• If there are no commands in the buffer, the IR port will continue trying to turn the device ON until a 'POF' or 'POD' command is received.
	• If the IR port fails to turn the device ON, a PUSH and RELEASE is made on channel 254 to indicate a power failure error.
	• You can only use the 'PON' and 'POF' commands when an IR device has a linked I/O channel.
	• Channel 255 changes are disabled after receipt of this command.
	Syntax:
	`PON`
	Example:
	`SEND_COMMAND IR_1,"'PON'"`
	Sends power up IR commands 27 or 9 to the IR_1 port.
	***Note**: When an IR/SERIAL port is linked and in PON state, the time delay set by the PTON Send Command (page 44) is used for power pulses sent out the port. See the Input Linking* section on page 27 *for details.*
		EXB-IRS4

NetLinx Send Commands (Cont.)		
Command	**Description**	**EXB Modules**
PTOF	Set the time duration between power pulses in .10-second increments. • This time increment is stored in permanent memory. • This command also sets the delay between pulses generated by the 'PON' or 'POF' Send Commands in tenths of seconds. • It also sets the delay required after a power ON command before a new IR function can be generated. This gives the device time to power up and get ready for future IR commands. • It also sets the delay required after a power ON command before a new IR function can be generated. This gives the device time to power up and get ready for future IR commands. • This command uses a binary parameter. To generate a Send Command of this type, use string expressions, such as: “'CH',$01”. Syntax: 'PTOF',<time> Variable: time = 0 - 255. Given in 1/10ths of a second. Default = 15 (1.5 seconds). Example: SEND_COMMAND IR_1,"'PTOF',$15" Sets the time between power pulses to 1.5 seconds for the IR_1 device.	• EXB-IRS4
PTON	Set the time duration between power pulses in .10-second increments. • This time increment is stored in permanent memory. • This command also sets the pulse length for each pulse generated by the 'PON' or 'POF' Send Commands in tenths of seconds. • This command uses a binary parameter. To generate a Send Command of this type, use string expressions, such as: “'CH',$01”. Syntax: 'PTON',<time> Variable: time = 0 - 255. Given in 1/10ths of a second. Default = 15 (1.5 seconds). Example: SEND_COMMAND IR_1,"'PTON',$15" Sets the duration of the power pulse to 1.5 seconds for the IR_1 device.	• EXB-IRS4
REBOOT	Reboot the Module. Syntax: REBOOT Example: SEND_COMMAND DEVICE_1,"'REBOOT'" Reboots DEVICE_1.	*All EXB Modules*

NetLinx Send Commands (Cont.)		
Command	**Description**	**EXB Modules**

RXCLR	Clear all characters in the receive buffer waiting to be sent to the Master.
	Syntax:
	`RXCLR`
	Example:
	`SEND_COMMAND RS232_1,"'RXCLR'"`
	Clears all characters in the receive buffer waiting to be sent to the Master.
		• EXB-COM2
		• EXB-MP1

RXOFF	Disable the transmission of incoming received characters to the Master (default).
	Syntax:
	`RXOFF`
	Example:
	`SEND_COMMAND RS232_1,"'RXOFF'"`
	Disable the transmission of incoming received characters to the Master (default).
		• EXB-COM2
		• EXB-MP1

RXON	Start transmitting received characters to the Master.
	Enables sending incoming received characters to the Master.
	This command is automatically sent by the Master when a 'CREATE_BUFFER' program instruction is executed.
	Syntax:
	`RXON`
	Example:
	`SEND_COMMAND RS232_1,"'RXON'"`
	Start the RS232_1 device's transfer of received characters to the Master.
		• EXB-COM2
		• EXB-MP1

SET BAUD	Set the COM port's communication parameters.
	***Note**: This value is not saved in Non-Volatile memory, and is reset to default (9600,8,N,1) at power-up.*
	Syntax:
	`SET BAUD <baud>,<parity>,<data>,<stop> [485 <Enable|Disable>]`
	Variables:
	• Baud: 19200, 9600, 4800, 2400, 1200, 600, 300, 150.
	• Parity: N (none), O (odd), E (even), M (mark), S (space)
	• Data: 7 or 8 data bits
	• Stop: 1 or 2 stop bits
	• 485 Disable (EXB-COM2 Port 1 only): Disables RS-485 mode and enables RS-232/422
	• 485 Enable (EXB-COM2 Port 1 only): Enables RS-485 mode and disables RS-234/422
	***Note**: The only valid 9 bit combination is (baud),N,9,1.*
	Example:
	`SEND_COMMAND DEVICE_1,"'SET BAUD 19200,N,8,1, 485 ENABLE'"`
	Sets the DEVICE_1 port's communication parameters to 19,200 baud, no parity, 8 data bits, 1 stop bit, and enables RS-485 mode.
	***Note:** The maximum baud rate for ports using DATA mode is 19200. Also, DATA mode works best when using a short cable length (< 10 feet).*
		• EXB-COM2
		• EXB-IRS4
		• EXB-MP1

NetLinx Send Commands (Cont.)		
Command	**Description**	**EXB Modules**

SET DBT	Set Debounce Mode in 10ms increments.
	• This setting applies to all channels of the specified port.
	• Range = 1 (10 ms) to 1000 (10 sec)
	• Default = 30
	Syntax:
	`SET DBT <time>`
	Example:
	`SEND_COMMAND DEVICE_1,'SET DBT 20'`
	Sets Debounce Mode to 20ms on DEVICE_1.
	***Note**: This value is not saved in Non-Volatile memory, and is reset to default (30) at power-up.*
		• EXB-I/O8
		• EXB-IRS4
		• EXB-MP1

SET DBTF	Set Debounce Mode in 2ms increments (set to last "DBT" or "DBTF" received).
	• This setting applies to all channels of the specified port.
	• Range = 1 (2 ms) to 1000 (2 sec)
	Syntax:
	`SET DBTF <time>`
	Example:
	`SEND_COMMAND DEVICE_1,'SET DBTF 12'`
	Sets Debounce Mode to 12ms on DEVICE_1.
		• EXB-I/O8
		• EXB-IRS4
		• EXB-MP1

SET INPUT	Sets the input channel's active state.
	An active state can be high (logic high) or low (logic low or contact closure). Channel changes, Pushes, and Releases generate reports based on their active state.
	Setting an input to ACTIVE HIGH will disable the output for that channel.
	Syntax:
	`SET INPUT <Channel> <State>`
	Variable:
	State = LOW or HIGH
	Example:
	`SEND_COMMAND IO,'SET INPUT 1 HIGH'`
	Sets the I/O channel to detect a high state change, and disables output on the channel.
		• EXB-I/O8
		• EXB-MP1

SET INPUT LINK	Sets an IR device to link to an input channel for use with 'PON' (page 43), 'POF' (page 44) and 'POD' (page 42) commands. • The input channel is used for power sensing (via a PCS). Syntax: `SET INPUT LINK` See the *Input Linking* section on page 27 for details. ***Note**: "SET INPUT LINK" is aliased as "SET IO LINK".*	• EXB-IRS4
SET IO LINK	Link an IR or Serial port to a selected I/O channel for use with the 'POD' (page 42), 'PON' (page 43), and 'POF' (page 44) commands. • The I/O status is automatically reported on channel 255 on the IR port. The I/O channel is used for power sensing (via a PCS or VSS). ***Note:** This command is included for older programs only. The Input port is not an I/O. No output functions are available.'SET IO LINK' applies the same configuration as the 'SET INPUT LINK' command.* Syntax: `SET IO LINK` See the *Input Linking* section on page 27 for details.	• EXB-IRS4

NetLinx Send Commands (Cont.)		
Command	**Description**	**EXB Modules**

SET MODE	Sets an IR port to either IR, Serial or Data mode.
	Syntax:
	`SET MODE <mode>`
	Variable:
	mode =
	• IR (standard IR output with carrier),
	• SERIAL (IR without carrier and waveform inverted)
	• DATA (1-way serial/TTL)
	Example:
	`SEND_COMMAND IR_1,"'SET MODE IR'"`
	Sets the IR_1 port to IR mode for IR control.
		• EXB-IRS4
		• EXB-MP1

SET_NDX_DESC	Set Friendly name and location for NDP. Syntax: `SET_NDX_DESC-friendly name:location` Max of 25 characters for *friendly name* and max of 25 characters for *location*. If more than 25 characters are sent for either friendly name or location, they will be truncated to a max of 25 characters. Neither the friendly name nor the location should contain a ":" character, as that is used as a delimiter. ***Note**: This command requires a reboot to enable new settings.*	*All EXB Modules*

SET OFF DELAY	Sets the delay between the time the input senses a transition to the OFF state and when the corresponding channel is turned off.
	• The delay resets every time the channel senses the ON state.
	• Time can be from 1 millisecond to 60 minutes, units in milliseconds.
	• 0 = disabled (*default*).
	Syntax:
	`SET OFF DELAY <chan>,<time>`
	Example:
	`SEND_COMMAND DEVICE_1,'SET OFF DELAY 1,100'`
	Sets the OFF delay on Channel 1 to 1 second on DEVICE_1.
		• EXB-I/O8
		• EXB-MP1

SET ON DELAY	Sets the delay between the time the input senses a transition to the ON state and when the corresponding channel is turned on.
	• The delay resets every time the channel senses the OFF state.
	• Time can be from 1 millisecond to 60 minutes, units in milliseconds.
	• 0 = disabled (*default*).
	Syntax:
	`SET ON DELAY <chan>,<time>`
	Example:
	`SEND_COMMAND DEVICE_1,'SET ON DELAY 1,100'`
	Sets the ON delay on Channel 1 to 1 second on DEVICE_1.
		• EXB-I/O8
		• EXB-MP1

NetLinx Send Commands (Cont.)		
Command	**Description**	**EXB Modules**

SP	Generate a single IR pulse.
	• Use 'CTON' (page 39) to set pulse lengths and 'CTOF' (page 39) for time off between pulses.
	• This command uses a binary parameter. To generate a Send Command of this type, use string expressions, such as: "'CH',$01".
	Syntax:
	`SP,<code>`
	Variable:
	code = IR code value 1 - 252 (253-255 reserved).
	Example:
	`SEND_COMMAND IR_1, "'SP',$25"`
	Pulses IR code 25 on IR_1 device.
		• EXB-IRS4
		• EXB-MP1

TSET BAUD	Set the COMport's communication parameters for a device.
	TSET BAUD is identical to SET BAUD.
	***Note**: This value is not saved in Non-Volatile memory, and is reset to default (9600,8,N,1) at power-up.*
	Syntax:
	`TSET BAUD <baud>,<parity>,<data>,<stop> [485 <Enable|Disable>]`
	Variables:
	• Baud: 115200, 76800, 57600, 38400, 19200, 9600, 4800, 2400, 1200, 600, 300, 150.
	• Parity: N (none), O (odd), E (even), M (mark), S (space)
	• Data: 7 or 8 data bits
	• Stop: 1 or 2 stop bits
	• 485 Disable (EXB-COM2 port 1 only): Disables RS-485 mode and enables RS-232/422
	• 485 Enable (EXB-COM2 port 1 only): Enables RS-485 mode and disables RS-234/422
	***Note**: The only valid 9 bit combination is (baud),N,9,1.*
	Example:
	`SEND_COMMAND RS232_1,"'TSET BAUD 115200,N,8,1 485 ENABLE'"`
	Sets the RS232_1 port's communication parameters to 115,200 baud, no parity, 8 data bits, 1 stop bit, and enables RS-485 mode.
	***Note**: Since this command does not save parameters to NV memory, the default data rate and format at power up is 9600, 8, N, 1.*
		• EXB-COM2
		• EXB-MP1

TXCLR	Stop and clear all characters waiting in the transmit out buffer and stops transmission.
	Syntax:
	`TXCLR`
	Example:
	`SEND_COMMAND RS232_1,"'TXCLR'"`
	Clears and stops all characters waiting in the RS232_1 device's transmit buffer.
		• EXB-COM2
		• EXB-MP1

NetLinx Send Commands (Cont.)		
Command	**Description**	**EXB Modules**
XCH	Transmit the selected channel IR codes in the format/pattern set by the 'XCHM' command. Syntax: `XCH <channel>` Variable: channel = 0 - 999. Example: For detailed usage examples, refer to the 'XCHM' command.	• EXB-IRS4 • EXB-MP1

XCHM	Changes the IR output pattern for the 'XCH' Send Command.
	Syntax:
	`XCHM <extended channel mode>`
	Variable:
	extended channel mode = 0 - 4.
	Example:
	`SEND_COMMAND IR_1,"'XCHM 3'"`
	Sets the IR_1 device's extended channel command to mode 3.
	Mode 0 Example (default): [x][x]<x><enter>
	`SEND_COMMAND IR_1,"'XCH 3'"`
	Transmits the IR code as 3-enter.
	`SEND_COMMAND IR_1,"'XCH 34'"`
	Transmits the IR code as 3-4-enter.
	`SEND_COMMAND IR_1,"'XCH 343'"`
	Transmits the IR code as 3-4-3-enter.
	Mode 1 Example: <x> <x> <x> <enter>
	`SEND_COMMAND IR_1,"'XCH 3'"`
	Transmits the IR code as 0-0-3-enter.
	`SEND_COMMAND IR_1,"'XCH 34'"`
	Transmits the IR code as 0-3-4-enter.
	`SEND_COMMAND IR_1,"'XCH 343'"`
	Transmits the IR code as 3-4-3-enter.
	Mode 2 Example: <x> <x> <x>
	`SEND_COMMAND IR_1,"'XCH 3'"`
	Transmits the IR code as 0-0-3.
	`SEND_COMMAND IR_1,"'XCH 34'"`
	Transmits the IR code as 0-3-4.
	`SEND_COMMAND IR_1,"'XCH 343'"`
	Transmits the IR code as 3-4-3.
	Mode 3 Example: [[100][100]…] <x> <x>
	`SEND_COMMAND IR_1,"'XCH 3'"`
	Transmits the IR code as 0-3.
	`SEND_COMMAND IR_1,"'XCH 34'"`
	Transmits the IR code as 3-4.
	`SEND_COMMAND IR_1,"'XCH 343'"`
	Transmits the IR code as 100-100-100-4-3.
	Mode 4:
	Mode 4 sends the same sequences as the 'CH' command. Only use Mode 4 with channels 0 - 199.
		• EXB-IRS4
		• EXB-MP1

NetLinx Send Commands (Cont.)		
Command	**Description**	**EXB Modules**

XOFF	Disable software handshaking (default).
	Syntax:
	`XOFF`
	Example:
	`SEND_COMMAND RS232_1,"'XOFF'"`
	Disables software handshaking on the RS232_1 device.
		• EXB-COM2
		• EXB-MP1

XON	Enable software handshaking.
	Syntax:
	`XON`
	Example:
	`SEND_COMMAND RS232_1,"'XON'"`
	Enables software handshaking on the RS232_1 device.
		• EXB-COM2
		• EXB-MP1

Refer to the Terminal (Telnet) Commands section on page 53 *for a listing of all supported Telnet commands.*

SEND_STRING Escape Sequences

The EXB-COM2 and EXB-MP1 support several special SEND_STRING escape sequences. If any of the character combinations listed below are found anywhere within a SEND_STRING program instruction, they will be treated as a command and not the literal characters.

Use the **ESCSEQON** and **ESCSEQOFF** NetLinx SEND_COMMANDS to control whether these are active or not. The **ESCSEQON** command must be precede the Escape Sequences, otherwise the strings will be processed normally.

EXB-COM2 & EXB-MP1 SEND_STRING Escape Sequences	
Command	Description

27,17	Send a break character for a specified duration to a specific device.
	Syntax:
	`27,17,<time>`
	Variable:
	time = 1 - 255 (measured in 100 microsecond increments)
	Example:
	`SEND_STRING RS232_1,"27,17,10"`
	Sends a break character of 1 millisecond to the RS232_1 device.

27,18,0	Clear the ninth data bit by setting it to 0 on all character transmissions.
	Used in conjunction with the 'B9MON' command (page 37).
	Syntax:
	`27,18,0`
	Example:
	`SEND_STRING RS232_1,"27,18,0"`
	Sets the RS232_1 device's ninth data bit to 0 on all character transmissions.

27,18,1	Set the ninth data bit to 1 for all subsequent characters to be transmitted.
	Used in conjunction with the 'B9MON' command (page 37).
	Syntax:
	`27,18,1`
	Example:
	`SEND_STRING RS232_1,"27,18,1"`
	Sets the RS232_1 device's ninth data bit to 1 on all character transmissions.

27,19	Insert a time delay before transmitting the next character.
	Syntax:
	`27,19,<time>`
	Variable:
	time = 1 - 255. Measured in 1 millisecond increments.
	Example:
	`SEND_STRING RS232_1,"27,19,10"`
	Inserts a 10 millisecond delay before transmitting characters to the RS232_1 device.

27,20,0	Set the RTS hardware handshake's output to high (> 3V).
	Syntax:
	`27,20,0`
	Example:
	`SEND_STRING RS232_1,"27,20,0"`
	Sets the RTS hardware handshake's output to high on the RS232_1 device.

27,20,1	Set the RTS hardware handshake's output to low/inactive (< 3V).
	Syntax:
	`27,20,1`
	Example:
	`SEND_STRING RS232_1,"27,20,1"`
	Sets the RTS hardware handshake's output to low on the RS232_1 device.

Terminal (Telnet) Commands

Overview

Telnet terminal communication can be accessed remotely via TCP/IP.

Establishing a Terminal Connection via Telnet

1. In your Windows task bar, go to **Start** > **Run** to open the Run dialog.
2. Type **cmd** in the *Open* field and click **OK** to open an instance of the Windows command interpreter - "Cmd.exe" (FIG. 11):

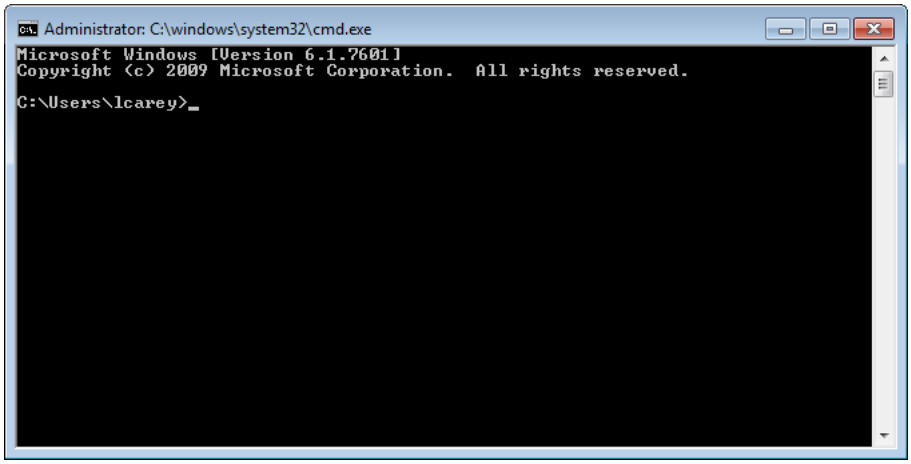


FIG. 11 Windows command interpreter (Cmd.exe)

3. Type "**telnet**" followed by a space and the EXB Module's IP Address info:
   ```
   >telnet XXX.XXX.XXX.XXX
   ```
4. Press <Enter>.
   - Without a Telnet password set, a session will begin with a welcome banner similar to the following:
     ```
     Welcome to EXB-COM2 v1.0.44 Copyright AMX LLC 2011
     >
     ```
   - If a Telnet password is set, then user credentials are required:
     ```
     Enter username:
     Enter protected password:
     Welcome to EXB-COM2 v1.0.44 Copyright AMX LLC 2011
     >
     ```

Telnet Username and Password

There are two Telnet commands that set the Telnet username and password:

- `Set Telnet Username` (see page 59)
- `Set Telnet Password` (see page 59)

By default, both the username and password are blank (empty string). Performing a factory reset on the device will return these values to that default. See the *Performing a Factory Reset* section on page 14 for details.

- Setting the *Username* will have no effect if the password remains blank (empty string). That is, defining the username alone will not result in Telnet prompting for user login.
- Setting the *Password* will cause Telnet to prompt for user login, whether the username has been defined or not. If the username has been defined, this value must be entered.

  However, since the password can be set independently of the username, it's possible to have a password defined, but the username still at its default (blank, empty string).

In this case, do not enter anything for the username when prompted. Simply press <Enter>, which will then present the password prompt. Here, the defined password must be entered, in order to successfully open the Telnet session.

Additional Notes

- Both the Telnet username and password are case-sensitive.
- Three consecutive, unsuccessful attempts to log in to Telnet will cause the Telnet window to close. Re-launching Telnet will again present the login prompt, with a fresh "batch" of login attempts.
- If Telnet login fails because of an incorrect username, you will receive the "Invalid Password" message (as opposed to an "Invalid Username" message).

Setting a Telnet Username and Password

To set a Telnet username and password:

1. Establish a terminal connection via Telnet.
2. Type **Set Telnet Username**, and press <Enter>.
   a. The program will prompt you to enter a new Telnet user name.
   b. Enter a username and press <Enter>.
   c. The program will indicate that the username is being stored.
3. Type **Set Telnet Password**, and press <Enter>.

Press <Enter> twice when asked to enter the password to clear both the telnet username and password.

   a. The program will prompt you to enter a password.
   b. Enter a password and press <Enter>.
   c. The program will prompt you to re-enter the Telnet password.
   d. Re-enter the password and press <Enter>.
   e. The program will indicate that the password is being stored.

Telnet Commands

The commands listed in the following table can be sent directly to the EXB Module via a Telnet terminal session.

In your terminal program, type "**Help**" or a question mark ("?") and **<Enter>** to access the Help Menu, and display the Program port commands described below:

Terminal Commands	
Command	Description
? or Help	Display this list of commands.

DEVICE STATUS	Display device status of a specified device, port, system (<D:P:S>).
	***Note**: Devices other than the EXB-xxx module itself will be ignored.*
	Example:
	`>device status 10102:1:1`
	`Device Status`
	`------------`
	`Device 10102 AMX LLC,EXB-IRS4,v0.0.25.0 contains 5 Ports.`
	`Port 1 - Channels:255 Levels:8`
	`MaxStringLen=64 Types=8 bit MaxCommandLen=64 Types=8 bit`
	`  The following input channels are on:None`
	`  The following output channels are on:None`
	`  Level 1=0 Supported data types=UByte,UInt`
	`  Level 2=0 Supported data types=UByte,UInt`
	`  Level 3=0 Supported data types=UByte,UInt`
	`  Level 4=0 Supported data types=UByte,UInt`
	`  Level 5=0 Supported data types=UByte,UInt`
	`  Level 6=0 Supported data types=UByte,UInt`
	`  Level 7=0 Supported data types=UByte,UInt`
	`  Level 8=0 Supported data types=UByte,UInt`
	`>`

Terminal Commands (Cont.)	
Command	Description
EXIT	Exit the telnet session
FACTORYFWIMAGE	Reset unit to factory firmware image and reboots the Module.

GET CONFIG	Display the current connection settings.
	Example:
	`>get config`
	`Device number: 10001`
	`Connection Settings`
	`------------------------------`
	`ICSNet/Ethernet: Ethernet`
	`Mode: URL`
	`System Number: 1`
	`Master IP/URL: 192.168.1.211`
	`Master Port: 1319`
	`Username:`
	`Password:`
	
	`IP Settings`
	`------------------------------`
	`HostName: localhost`
	`Type: DHCP`
	`IP Address: 192.168.1.53`
	`Subnet Mask: 255.255.255.0`
	`Gateway IP: 192.168.1.1`
	`MAC Address: 00:60:9f:94:2d:4f`
	
	`DNS Servers`
	`------------------------------`
	`Domain suffix: amx.internal`
	`Entry 1: 192.168.20.7`
	`Entry 2: 192.168.20.9`
	***Note**: The system number and IP addressing information displayed is reflective of actual operating values, not stored parameters.*

GET CONNECTION	Show the Module connection information.
	Example:
	`>get connection`
	`Connection Settings`
	`------------------------------`
	`ICSNet/Ethernet: Ethernet`
	`Mode: URL/TCP`
	`System Number: 1`
	`Master IP/URL: 192.168.1.211`
	`Master Port: 1319`
	`Username:`
	`Password:`

GET DEVICE	Display the device number.

GET DNS	Get list of DNS entries.
	Example:
	`>get dns`
	`DNS Servers`
	`------------------------------`
	`Domain suffix: amx.internal`
	`Entry 1: 192.168.20.7`
	`Entry 2: 192.168.20.9`
	***Note**: When the module is in DHCP mode, these are active values, NOT the stored values that only apply to static mode.*

GET ETHERNET MODE	Display the current LAN configuration setting.
	Settings are either "auto" in which the LAN driver will discover it's settings based on the network it is connected to OR <speed> and <duplex> where speed is either 10 or 100 and duplex is either full or half.
	Example:
	`>GET ETHERNET MODE`
	`Ethernet mode is auto.`
	***Note**: See SET ETHERNET MODE (page 58).*

GET FRIENDLY <name>	Displays the Module's friendly name (for NDP).

Terminal Commands (Cont.)	
Command	Description

GET IP	Displays the IP configuration of a device.
	The device displays it's D:P:S, Host Name, Type (*DHCP* or *Static*), IP Address, Subnet Mask, Gateway IP, and MAC Address.
	Example:
	`>GET IP`
	`HostName MLK_INSTRUCTOR`
	`Type DHCP`
	`IP Address 192.168.21.101`
	`Subnet Mask 255.255.255.0`
	`Gateway IP 192.168.21.2`
	`MAC Address 00:60:9f:90:0d:39`

GET LOCATION	Displays the location parameter for NDP (set by *SET LOCATION* - see page 58).
GET SN	Returns the device's serial number

MSG [ON|OFF]	Enables/Disables extended diagnostic messages.
	• MSG On [error|warning|info|debug] sets the terminal program to display log messages generated by the Master.
	The level of log printed to the terminal window depends both on the level used when sending the message and the output level selected with "msg on."
	For example if log output is enabled via "msg on warning" then logs produced at levels AMX_ERROR and AMX_WARNING will be displayed, but not logs produced at levels AMX_INFO or AMX_DEBUG.
	The order of severity from highest to lowest is ERROR, WARNING, INFO, DEBUG.
	If no severity is supplied with "msg on", the default setting is WARNING.
	• MSG OFF disables the display.
	Example:
	`> MSG ON`
	`Extended diagnostic information messages turned on.`
	`> MSG OFF`
	`Extended diagnostic information messages turned off.`

NDP UNBIND	Clears the NDP binding to a master (takes effect after next boot).

PING [ADDRESS]	Pings an address (IP or URL), to test network connectivity to and confirms the presence of another networked device.
	The syntax matches the PING application in Windows or Linux.
	Example:
	`>ping 192.168.29.209`
	`192.168.29.209 is alive.`

REBOOT	Reboots the EXB Module.
	Example:
	`>REBOOT`
	`Rebooting...`

RENEW DHCP	Renews/Releases the current DHCP lease for the EXB Module. Example: `>RENEW DHCP`
RESET FACTORY	Resets the device's stored parameters to factory default state including removal of all security settings, resetting to DHCP. This command will cause an automatic reboot. ***Note**: This command does not reset the device to the factory software image.*

Terminal Commands (Cont.)	
Command	Description
SET CONNECTION	Set the master connection settings interactively, allowing the user to specify the mode. • If mode is TCP or UDP, the master URL and port number can be specified as well. • If AUTO is selected, the System number can be specified. • After all data is entered, if the parameters have changed, the Module will disconnect from the Master, and begin trying to connect with the new settings. ***Note**: These changes do not require a reboot to take effect.*
SET DEVICE	Set the device number, and store in non-volatile memory. Syntax: `SET DEVICE <num>` The valid range of device numbers is 0-31999. • If the user enters a number outside that range, then no change will be made and the Module will issue an error message. • A Device Number of '0' means that the Module will accept the auto-assigned device number from the Master. • If the new device number is different from the old device number, the Module will disconnect from the Master, and begin trying to connect with the new settings. ***Note**: These changes do not require a reboot to take effect.*

SET DNS	Set the DNS configuration of the EXB Module, only as applied to Static IP addressing mode (DNS settings in DHCP mode are received from the DHCP server).
	Syntax:
	`SET DNS <D:P:S>`
	This command prompts you to enter a Domain Name, DNS IP #1, DNS IP #2, and DNS IP #3.
	• Enter Y (yes) to approve/store the information in the Master.
	• Enter N (no) cancels the operation.
	***Note**: The device must be rebooted to enable new settings.*
	Example:
	`>SET DNS [0:1:0]`
	`-- Enter New Values or just hit Enter to keep current settings --`
	`Enter Domain Suffix: amx.com`
	`Enter DNS Entry 1 : 192.168.20.5`
	`Enter DNS Entry 2 : 12.18.110.8`
	`Enter DNS Entry 3 : 12.18.110.7`
	`You have entered: Domain Name: amx.com`
	`DNS Entry 1: 192.168.20.5`
	`DNS Entry 2: 12.18.110.8`
	`DNS Entry 3: 12.18.110.7`
	`Is this correct? Type Y or N and Enter -> Y`
	`Settings written. Device must be rebooted to enable new settings`

Terminal Commands (Cont.)	
Command	Description

SET ETHERNET MODE	This command sets the current LAN configuration settings per new mode.
	Syntax:
	`SET ETHERNET MODE <newmode>`
	Values for *newmode* are:
	`auto`
	- or -
	`10 | 100 full | half`
	***Note**: This command requires a reboot to enable new settings.*
	Examples :
	`set ethernet mode auto`
	`set ethernet mode 100 full`
	***Note**: See GET ETHERNET MODE* on page 55*.*

SET FRIENDLY	Set the device's friendly name for NDP to <name>. Syntax: `SET FRIENDLY <name>` • Maximum length = 25 characters. If the name entered exceeds 25 characters, it will be truncated. • The value is stored in non-volatile memory. • If no value specified, an automatic name consisting of AMX, the product name, and serial number will be used. ***Note**: This command requires a reboot to enable new settings.*

SET IP	Sets the IP configuration of a specified device.
	Enter a Host Name, Type (*DHCP* or *Fixed*), IP Address, Subnet Mask, and Gateway IP Address.
	***Note**: "DHCP" implies "DHCP with link-local fallback".*
	***Note**: For NetLinx Masters, the "Host Name" can only consist of alphanumeric characters.*
	• Enter Y (yes) to approve/store the information into the Master.
	• Enter N (no) to cancel the operation.
	***Note**: This command requires a reboot to enable new settings.*
	Example:
	`>SET IP`
	`--- Enter New Values or just hit Enter`
	`to keep current settings ---`
	`Enter Host Name: MLK_INSTRUCTOR`
	`Enter IP type. Type D for DHCP or S for Static IP and then Enter: DHCP`
	`Enter Gateway IP: 192.168.21.2`
	`You have entered: Host Name MLK_INSTRUCTOR`
	`Type DHCP`
	`Gateway IP 192.168.21.2`
	`Is this correct? Type Y or N and Enter -> y`
	`Settings written. Device must be rebooted to enable new settings.`
	***Note**: EXB Modules can also be set to Static IP or DHCP Mode via the front panel ID Pushbutton. See the Toggling Between Static and DHCP IP Addressing* section on page 14 *for details.*

SET LOCATION	Sets the location parameter for NDP. Syntax: `SET LOCATION <location>` • Maximum length = 25 characters. If the name entered exceeds 25 characters, it will be truncated. ***Note**: This command requires a reboot to enable new settings.*

Terminal Commands (Cont.)	
Command	Description

SET TELNET PORT	Sets the device's IP port listened to for Telnet connections.
	Example:
	`>SET TELNET PORT`
	`Current telnet port number = 23`
	`Enter new telnet port number (Usually 23)(0=disable Telnet):`
	Once you enter a value and press <Enter>, you get the following message:
	`Setting telnet port number to 23`
	`New telnet port number set, reboot the device for the change to take effect.`
	***Note**: This command requires a reboot to enable new settings.*
	See the *Enabling / Disabling Telnet on EXB Modules* section on page 60 for additional information.

SET TELNET USERNAME	Set the Username for a secure Telnet session. • Default = blank (no username required) • See the *Setting a Telnet Username and Password* section on page 54 for details.
SET TELNET PASSWORD	Set the Password for a secure Telnet session. • Default = blank (no password required) • See the *Setting a Telnet Username and Password* section on page 54 for details.
SHOW CONNECTION LOG	Show the master connection log for the device

SHOW CONNECTION STATS	Show the connection statistics for the device.
	Output similar to the following example:
	`>show connection stats`
	`Connection Statistics`
	`Total Last 15 Minutes`
	`===== ==========`
	`ICSP Messages: 10039 received 333 received`
	`10038 transmitted 333 transmitted`
	`Blink Messages: 5014 received 166 received`
	`IP Statistics:`
	`RX packets:29298 errors:0 discarded:0`
	`TX packets:15286 errors:0 discarded:0`

SHOW LOG	Display the message log. Syntax: `SHOW LOG <start>` • Use <start> to specify the message number to start displaying • Use <all> to display all messages.

Notes on Specific Telnet Clients

Telnet and terminal clients will have different behaviors in some situations. This section states some of the known anomalies.

Windows Client Programs

Anomalies occur when using a Windows™ client if you are not typing standard ASCII characters (i.e. using the keypad and the ALT key to enter decimal codes). Most programs will allow you to enter specific decimal codes by holding ALT and using keypad numbers.

For example, hold ALT, hit the keypad 1, then hit keypad 0, then release ALT. The standard line feed code is entered (decimal 10). Windows will perform an ANSI to OEM conversion on some codes entered this way because of the way Windows handles languages and code pages.

The following codes are known to be altered, but others may be affected depending on the computer's setup.

Characters **15**, **21**, **22**, and **any characters above 127**.

This affects both Windows Telnet and Terminal programs.

Linux Telnet Client

The Linux Telnet client has three anomalies that are known at this time:

- A null (\00) character is sent after a carriage return.
- If an ALT 255 is entered, two 255 characters are sent (per the Telnet RAFT).
- If the code to go back to command mode is entered (ALT 29 which is ^]), the character is not sent, but Telnet command mode is entered.

Enabling / Disabling Telnet on EXB Modules

By default, Telnet is enabled on all EXB Modules. The default Telnet port is **23**.

The Telnet port can be changed via the SET TELNET PORT command (see page 59). Setting the Telnet port to zero will disable Telnet access.

The SET TELNET PORT command requires a reboot to enable new settings.

The only way to re-enable Telnet once it has been disabled is to reset the unit to the factory default firmware image. See the Resetting the Unit to the Factory Default Firmware Image section on page 14 *for details.*

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